Final
Integrated Natural Resources Management Plan
Fort Monmouth, New Jersey

Prepared for

Fort Monmouth, New Jersey

by

U.S. Army Corps of Engineers
Mobile District

with Technical Assistance from

Tetra Tech, Inc.
Fairfax, VA 22030
Under Contract No. DACA01-96-D-001, DO No. 0071

December 1999

FINDING OF NO SIGNIFICANT IMPACT
FOR IMPLEMENTING AN INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN
FOR FORT MONMOUTH, NEW JERSEY

Pursuant to the Council on Environmental Quality (CEQ) Regulations (40 CFR Parts 1500-1508) for implementing the procedural provisions of the National Environmental Policy Act (42 U.S.C. 4321 et seq.) and Army Regulation 200-2 (*Environmental Effects of Army Actions*), Fort Monmouth has conducted an Environmental Assessment (EA) of the potential effects associated with implementing an Integrated Natural Resources Management Plan (INRMP). Fort Monmouth has prepared this INRMP in accordance with the provisions of the Sikes Act (16 U.S.C. 670a et seq.) and Army Regulation 200-3 *(Natural Resources—Land, Forest, and Wildlife Management)*.

Proposed Action. Fort Monmouth proposes to implement an INRMP, which supports the management of natural resources as described by the plan itself. The purpose of the proposed action is to carry out the set of resource-specific management measures developed in the INRMP, which would enable Fort Monmouth to manage effectively the use and condition of natural resources located on the installation. Implementation of the proposed action would support the Army's continuing need to meet mission and community support requirements, practice sound resource stewardship, and comply with environmental policies and regulations.

The proposed action supports an ecosystem approach and includes natural resource management measures to be undertaken on Fort Monmouth, located in Monmouth County, New Jersey. The proposed action focuses on a 5-year planning period, which is consistent with the time frame for the management measures described in the INRMP. This planning period would begin in Fiscal Year (FY) 2000 and end in FY 2004. Additional environmental analyses may be required as new management measures are developed over the long-term (beyond 5 years).

Alternatives. The development of proposed management measures for the INRMP included a screening analysis of resource-specific alternatives. The screening analysis involved the use of accepted criteria, standards, and guidelines, when available, and best professional judgement, to identify management practices for achieving Fort Buchanan's natural resource management objectives. The outcome of the screening analysis led to the development of the proposed action as described above. Consistent with the intent of NEPA, this screening process focused on identifying a range of reasonable resource-specific management alternatives and, from that, developing a plan that could be implemented, as a whole, in the foreseeable future. Management alternatives deemed to be infeasible were not analyzed further. As a result of the screening process, the EA, made an integral part of the INRMP, formally addresses two alternatives, the proposed action (implementation of the INRMP) and the no action alternative.

Implementation of the no action alternative means that the proposed management measures set forth in the INRMP would not be implemented. Current management measures for natural resources would remain in effect, and existing conditions would continue. This document refers to the continuation of existing (baseline) conditions of the affected environment, without implementation of the proposed action, as the no action alternative. Inclusion of a no action alternative is prescribed by CEQ regulations and serves as a benchmark against which the proposed action could be evaluated.

Factors Considered in Determining that No Environmental Impact Statement is Required. The EA, which is incorporated by reference into this Finding of No Significant Impact (FNSI), examines potential effects of the proposed action and the no action alternative on resources and areas of environmental concern that could be affected by implementing the INRMP. These include ecoregion and local setting; climate; land use and airspace use; air quality; noise; water quality; topography; geology; soils; petroleum and minerals; water resources; infrastructure; hazardous and toxic materials; upland habitats; wetlands and riparian habitats; flora; fauna; preserves, special habitats, and significant natural areas; endangered, threatened, and rare species; cultural resources; socioeconomic resources; and environmental justice. Implementation of the proposed action would result in either no effects or beneficial effects on the identified resources and areas of environmental concern.

Findings. Based on the results of the EA, it is determined that implementation of the proposed action would have no significant direct, indirect or cumulative impacts on the quality of the natural or human environment. Implementation of the INRMP would be expected to improve existing conditions at Fort Monmouth, as shown by the potential for beneficial effects. The proposed action would enable Fort Monmouth to achieve its goal of maintaining or improving the condition of natural resources while supporting the military mission. Because there would be no significant environmental impacts resulting from implementation of the proposed action, an Environmental Impact Statement is not required and will not be prepared.

Comments on the INRMP and this FNSI by any interested party may be submitted to Mr. Brian Peck, U.S. Army Engineer District, Mobile, 109 St. Joseph Street, Mobile Alabama, 36628-0001. The deadline for receipt of comments is 30 days from the publication of a Notice of Availability of the final INRMP and EA in the local newspaper. The INRMP is available for public review at the Monmouth County Public Library, Eastern Branch, Route 35, Shrewsbury, New Jersey, 07702.

Date: _____

_____

Dinkerrai Desai
Environmental Coordinator
Directorate of Public Works
Fort Monmouth, New Jersey

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

FORT MONMOUTH, NEW JERSEY

PREPARED FOR

Fort Monmouth, New Jersey

PREPARED BY

U.S. Army Corps of Engineers
Mobile District
under Contract No. DACA01-96-D-0011, DO No. 0071

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

FORT MONMOUTH, NEW JERSEY

This Integrated Natural Resources Management Plan has been developed by Fort Monmouth in cooperation with the United States Department of the Interior, Fish and Wildlife Service, and the New Jersey Division of Fish, Game, and Wildlife. The signatures below indicate the mutual agreement of the parties concerning the conservation, protection, and management of fish and wildlife resources as presented in the plan.

PLAN APPROVAL

Mark H. Johnson
Lieutenant Colonel, U.S. Army
Commander, Garrison
Fort Monmouth, New Jersey

31 Jan 00
Date

AGENCY AGREEMENT

Ronald E. Lambertson
Regional Director
Northeast Regional Office, Region 5
U.S. Fish and Wildlife Service
Hadley, Massachusetts

3/2/00
Date

Robert McDowell
Director
New Jersey Division of Fish,
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1-19-00
Date

FORT MONMOUTH REVIEW

James Ott, Director
Directorate of Public Works
Fort Monmouth

1/10/2000
Date

Dinkerrai Desai
Environmental Coordinator
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1/6/2000
Date

Robert Melascaglia
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U.S. Army Materiel Command
ATTN: Directorate of Public Works
Fort Monmouth, New Jersey

EXECUTIVE SUMMARY

PURPOSE

The purpose of this Integrated Natural Resources Management Plan (INRMP) is to guide the natural resources management program at Fort Monmouth from fiscal year (FY) 2000 through FY 2004 and to provide a solid foundation on which to build the program beyond the year 2004. This INRMP will allow Fort Monmouth to achieve its goal to support the military mission and maintain viable natural resources. In addition, this INRMP will ensure that natural resources conservation measures and Army activities on Fort Monmouth are integrated and are consistent with federal stewardship requirements.

This plan also contains the associated documentation required for compliance with the National Environmental Policy Act (NEPA), which requires federal agencies to consider the environmental consequences of major proposed actions. The NEPA documentation is in the form of an environmental assessment (EA), which analyzes the potential consequences of the proposed action to implement the Fort Monmouth INRMP.

ENVIRONMENTAL COMPLIANCE

Under the Natural Resource Management on Military Lands Act of 1960 (Title 16 of the *United States Code* [U.S.C.], Section 670a and following), commonly known as the Sikes Act, as amended according to the Sikes Act Improvement Act of 1997,

> The Secretary of Defense shall carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. To facilitate the program, the Secretary of each military department shall prepare and implement an integrated natural resources management plan for each military installation in the United States under the jurisdiction of the Secretary. Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Secretaries of the military departments shall carry out the program to provide for the conservation and rehabilitation of natural resources on military installations; the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and non-consumptive uses; and subject to safety requirements and military security, public access to military installations to facilitate the use.

Per 16 U.S.C. § 670a(b), the Sikes Act Improvement Act of 1997, to the extent appropriate and applicable, this INRMP provides for the following:

- Fish and wildlife, land, and forest management.
- Fish and wildlife habitat enhancement or modification.
- Wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants.
- Integration of, and consistency among, the various activities conducted under the plan.
- Establishment of specific natural resource management goals and objectives and time frames for proposed action.
- Sustainable use by the public of natural resources to the extent that the use is not inconsistent with the military mission and the needs of fish and wildlife resources.

- Public access to the military installation that is necessary or appropriate for the use described above, subject to requirements necessary to ensure safety and military security.
- Enforcement of applicable natural resource laws (including regulations).
- No net loss in the capability of military installation lands to support the military mission of the installation.
- Such other activities as the Secretary of the military department determines appropriate.

Army Regulation (AR) 200-3 (*Natural Resources—Land, Forest, and Wildlife Management*) "sets forth policy, procedures and responsibilities for the conservation, management, and restoration of land and the natural resources thereon consistent with the military mission and in consonance with national policies." AR 200-2, *Environmental Effects of Army Actions*, "sets forth policy, responsibilities, and procedures for integrating environmental considerations into Army planning and decision making" (HQDA, 1988). In particular, AR 200-2, Chapter 2-6e, *Integration with Army Planning*, states that "environmental analyses and documentation required by this regulation will be integrated as much as practicable with other environmental reviews, laws, and executive orders, and . . . installation management plans, particularly those that deal directly with the environment. These include the Natural Resource Management Plans." AR 200-2 also implements the Council on Environmental Quality's (CEQ) NEPA regulations, Executive Order 12114, and Department of Defense (DoD) Directives 6050.1 and 6050.7. The NEPA process involves an interdisciplinary assessment of reasonably foreseeable, potential environmental consequences of implementing a proposal. AR 200-2 applies to the active Army, Army National Guard, and Army Reserve.

Thus, in preparing this INRMP Fort Monmouth has maintained its commitment to ensure that environmental considerations are integral to installation mangement and has complied with AR 200-2 and AR 200-3 by integrating INRMP and NEPA compliance documentation. In addition, this INRMP provides the guidance necessary for Fort Monmouth to maintain compliance with DoD Instruction 4715.3 (*Environmental Conservation Program*), Executive Order 11990 (Protection of Wetlands), the Clean Water Act, and the Endangered Species Act.

SCOPE

This INRMP focuses equally on management of the natural areas on Fort Monmouth and management of the developed lands because the conditions (health) of the two are related and both are integral components of the installation's natural resources. The management measures have been developed based on the current conditions of the resources and the anticipated military mission and activities. This INRMP will guide natural resources management at Fort Monmouth for the next 5 years (FY 2000 through FY 2004) and will provide a solid foundation from which to build the program beyond the year FY 2004.

The EA scope of analysis is based on identifying, documenting, and evaluating potential effects of implementing the INRMP for Fort Monmouth. The EA examines the Army's preferred alternative and a no action alternative. Implementation of the preferred alternative (the proposed action) would mean that the selected management measures set forth in the INRMP would be adopted. Implementation of the no action alternative would mean that existing conditions would continue as the status quo, and no new management measures would be implemented. The development of these selected management measures for the INRMP involved a screening analysis of resource-specific management alternatives. The screening analysis involved the use of accepted criteria, standards, and guidelines, when available, and best professional judgment to identify management practices for achieving Fort Monmouth's natural resource management objectives. The outcome of the screening analysis led to the development of the proposed action. Application of this

screening process in developing the proposed action, i.e., adoption of the management measures contained in the INRMP, eliminated the need to define and evaluate hypothetical alternatives to plan implementation.

RELATIONSHIP TO THE MILITARY MISSION

Fort Monmouth's primary mission is to provide command, administrative, and logistical support for Headquarters, United States Army, Communications and Electronics Command (CECOM). CECOM is a major subordinate command of the United States Army Materiel Command (AMC) and is the host activity. The support provided is used by tenant activities in the performance of research, development, procurement, and production of electronic materiel for use by the United States Armed Forces. Other missions include the provision of administrative training and logistical and related support necessary to transition selected reserve component units into the active force structure in the event of a national emergency. This installation also serves as host command and provides support functions to approximately 28 tenant activities.

In general, the natural resources present on the installation and their management have no impact on the military mission of Fort Monmouth. The grounds of the installation are not used for military training, and the nature of the activities that occur at Fort Monmouth is such that their conduct has no impact on natural resources. No federally endangered or threatened plant or animal species are known to exist on Fort Monmouth, so special protective measures for such species are not necessary. Wetlands and cultural resources have been identified on the installation, and their protection is required. Compliance regarding these latter resources falls under the Clean Water Act and National Historic Preservation Act, respectively.

PARTNERSHIPS

The primary partners involved in the development of this plan include the U.S. Fish and Wildlife Service (USFWS); the New Jersey Division of Fish, Game, and Wildlife (NJDFGW); and the State of New Jersey Natural Heritage Program.

PLANNED MAJOR INITIATIVES

The natural resources management program will either implement or continue to conduct a number of significant projects. Those projects which require funding will proceed only once funding is obtained. Nothing in this plan can be interpreted to violate the Anti-Deficiency Act. Subject to the availability of funding, the High-Priority Projects include the following:

- Implement ecosystem principles in managing natural resources at Fort Monmouth (FY 2000-2004).
- Conduct a vegetative community and flora planning level survey (PLS) of the non-wetland forested areas (FY 2000).
- Conduct a PLS for federally listed endangered and threatened species (FY 2000).
- Implement erosion control measures (FY 2000–2004).
- Continue to monitor water quality in all installation waters (FY 2000–2004).
- Convert maintained grounds to natural vegetation (FY 2001–2004).
- Maintain habitat quality along brooks and streams (FY 2000–2004).
- Investigate the cause of poor water quality in Husky Brook Lake (FY 2000–2004).
- Improve water quality in Husky Brook Lake (FY 2002–2004).

COSTS AND BENEFITS

The benefits of this INRMP are numerous. For the military mission, the natural resources management program, as described in this INRMP, will ensure that the environmental conditions of the installation are maintained. From an environmental perspective, implementation of this plan will maintain, protect, and enhance the installation's natural resources and habitats.

The annual funding necessary to fully implement this INRMP varies from $4,000 to $5,000 in FY 2000 to FY 2003, to $45,000 in FY 2004. The total cost over 5 years of fully implementing this INRMP is $63,000.

Fort Monmouth, AMC, USFWS, and NJDFGW recognize that year-to-year congressional appropriations for the implementation of the Army's mission or changes in the Fort Monmouth mission may reflect different priorities. If those priorities require deferral, redirection, or cancellation of planned projects or plans, Fort Monmouth, in consultation with AMC, will determine which projects or plans should be implemented first. In every case, Fort Monmouth and AMC will ensure that constraints on the military mission are minimized and avoided wherever possible.

It is understood that congressional budget constraints will require implementation of the INRMP by in-house staff. Current government-wide goals of reducing the number of federal employees indicate that the employment of additional permanent full-time natural resources professionals and paraprofessionals will be severely limited during the life of this plan.

NATIONAL ENVIRONMENTAL POLICY ACT

Under NEPA, federal agencies are required to consider the environmental consequences of major proposed actions. The intent of NEPA is to protect, restore, or enhance the environment through well-informed federal decisions. This act is premised on the assumption that providing information to the decision maker, or proponent, and the public will improve the quality of final decisions.

The CEQ was established under NEPA to implement and oversee federal policy in the decision-making process. To this end, the CEQ has issued *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (Title 40 of the *Code of Federal Regulations* [CFR], Parts 1500-1508). CEQ regulations specifically permit NEPA documents to be combined with other agency documents to reduce duplication and paperwork (40 CFR 1506.4). These regulations encourage agencies to focus on the purpose of the NEPA analysis—making better decisions. This philosophy continues to be supported by Army leadership, the U.S. Environmental Protection Agency, and the CEQ.

Integration. The Army is beginning to combine the INRMP and its associated NEPA documentation, recognizing the efficiencies in cost and time that could be realized from such an approach to the planning development process. This approach embraces the intent and spirit of NEPA, as well as the requirements of AR 200-2 and AR 200-3. The resultant planning assessment formalizes existing natural resource practices and can be used as an effective tool for future planning and decision-making purposes.

Purpose of and Need for Proposed Action. Fort Monmouth is proposing to implement the INRMP for the installation. The purpose of the proposed action is to enable the installation to manage the use and condition of natural resources located on the installation efficiently. Implementation would support the Army's underlying need to meet mission requirements and comply with environmental regulations.

Environmental Consequences. The EA evaluates the potential environmental consequences of implementing the proposed action and the no action alternative Implementation of the proposed action, the Army's preferred alternative, would mean that the selected management measures would be adopted and implemented, to the extent practicable given funding and workforce constraints Implementation of the no action alternative would mean that existing conditions would continue as the status quo. Under the no action alternative, no new management practices would be implemented and an INRMP would not be formalized

The development of the management measures involved a screening analysis of resource-specific management alternatives based on various screening criteria. This process focused on considering a reasonable range of resource-specific management alternatives and, from those, developing a plan that could be implemented, as a whole, in the foreseeable future. Alternatives deemed infeasible were dropped from the detailed analysis

Potential environmental consequences of the preferred alternative, implementing the selected management measures presented in the INRMP, are summarized in Table ES-1 There would be no significant adverse effects Potential consequences would result in no effects or beneficial effects on each resource area.

Table ES-1
Summary of Potential Environmental Consequences.

	Environmental Consequence	
Resource Area/Environmental Condition[1]	**No Action**	**Proposed Action**
Ecoregion and Local Setting	None	None
Climate	None	None
Land Use and Airspace Use	None	None
Air Quality	None	None
Noise	None	None or Minor Beneficial
Water Quality	None	Beneficial
Topography	None	None
Geology	None	None
Soils	Minor Adverse	Minor Beneficial
Petroleum and Minerals	None	None
Water Resources	None	None
Infrastructure	None	None
Hazardous and Toxic Materials	None	None
Upland Habitats	Minor Adverse	Minor Beneficial
Wetlands and Riparian Habitats	Minor Adverse	Beneficial
Flora	None	Minor Beneficial
Fauna	None	Minor Beneficial
Preserves, Special Habitats, and Significant Natural Areas	None	None
Endangered, Threatened, and Rare Species	None	None
Cultural Resources	None	None
Socioeconomic Resources	None	None
Environmental Justice	None	None
Cumulative Effects[2]	None	Minor Beneficial

[1] Resource areas presented in this column are the same resource areas presented in Section 3 0, *Affected Environment*

[2] Cumulative effects (see Section 7 3) have been added to this table for the reader's convenience

SUMMARY

This document reflects the Army's commitment to conserve, protect, and enhance the natural resources on its installations. The primary purpose and objective of this document is to present an implementable INRMP that guides Fort Monmouth in achieving natural resource management goals, meeting mission requirements, and complying with environmental policies and regulations. In addition, the NEPA analysis required for undertaking this major federal action (implementation of the plan) is embodied within the INRMP. This document includes a comprehensive description, evaluation, and assessment of environmental conditions and natural resources at Fort Monmouth.

This INRMP is the plan that will direct the natural resources management program at Fort Monmouth from FY 2000 through FY 2004. An ecosystem approach was used to develop the management measures for each resource area. Implementation of the management measures will maintain, protect, and enhance the ecological integrity of the installation lands and the biological communities that inhabit them.

Command support is essential for the implementation of this INRMP and is required for many of the natural resources management projects described herein. This INRMP has the full support of the Installation Commander and other personnel in command positions at Fort Monmouth.

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SECTION 1.0: INTRODUCTION

> *The Army will be a national leader in environmental and natural resource stewardship for present and future generations as an integral part of our mission.*
>
> —*United States Army Environmental Strategy into the 21st Century*, 1992

The purpose of this Integrated Natural Resources Management Plan (INRMP) is to guide the natural resources management program at Fort Monmouth from FY 2000 through FY 2004 and to provide a solid foundation on which to build the program beyond FY 2004. This INRMP will allow Fort Monmouth to achieve its goal to support the military mission of the installation and maintain viable natural resources. In addition, this INRMP will ensure that natural resources conservation measures and Army activities on Fort Monmouth land are integrated and are consistent with federal stewardship requirements.

Under the Natural Resource Management on Military Lands Act of 1960 (Title 16 of the *United States Code* [U.S.C.], Section 670a and following), commonly known as the Sikes Act, as amended according to the Sikes Act Improvement Act of 1997,

> The Secretary of Defense shall carry out a program to provide for the conservation and rehabilitation of natural resources on military installations. To facilitate the program, the Secretary of each military department shall prepare and implement an integrated natural resources management plan for each military installation in the United States under the jurisdiction of the Secretary. Consistent with the use of military installations to ensure the preparedness of the Armed Forces, the Secretaries of the military departments shall carry out the program to provide for the conservation and rehabilitation of natural resources on military installations; the sustainable multipurpose use of the resources, which shall include hunting, fishing, trapping, and non-consumptive uses; and subject to safety requirements and military security, public access to military installations to facilitate the use.

Per 16 U.S.C. § 670a(b), the Sikes Act Improvement Act of 1997, to the extent appropriate and applicable, this INRMP provides for the following:

- Fish and wildlife, land, and forest management.
- Fish and wildlife habitat enhancement or modification.
- Wetland protection, enhancement, and restoration, where necessary for support of fish, wildlife, or plants.
- Integration of, and consistency among, the various activities conducted under the plan.
- Establishment of specific natural resource management goals and objectives and time frames for proposed action.
- Sustainable use by the public of natural resources to the extent that the use is not inconsistent with the military mission and the needs of fish and wildlife resources.
- Public access to the military installation that is necessary or appropriate for the use described above, subject to requirements necessary to ensure safety and military security.
- Enforcement of applicable natural resource laws (including regulations).
- No net loss in the capability of military installation lands to support the military mission of the installation.
- Such other activities as the Secretary of the military department determines appropriate.

The *United States Army Environmental Strategy into the 21st Century* (HQDA, 1992) provides the framework to ensure that environmental considerations are integral to the Army mission and that an environmental stewardship ethic governs all Army activities. The Army's environmental strategy is depicted in a model of a building with a foundation and four pillars supporting the overall vision of environmental stewardship. The strategy's goals focus on the four pillars, which represent compliance, restoration, prevention, and conservation.

The general goal of the conservation pillar is to conserve, protect, and enhance environmental and natural and cultural resources, using all practical means consistent with Army missions, so that present and future generations can use and enjoy them. Resource management in the conservation pillar is focused on conservation and preservation. Conservation involves the responsible management of Army lands to ensure long-term natural resource productivity so the Army can achieve its mission. Conservation balances the need for long-term resource use and resource protection. Preservation focuses on resource protection by limiting use by the Army community. Preservation is essential for ensuring the future integrity of valuable national resources, such as wetlands; endangered, threatened, and rare species habitat; and historic and cultural sites.

The Army's commitment to the conservation of its natural resources is further reflected in Army Regulation (AR) 200-3, *Natural Resources—Land, Forest, and Wildlife Management,* and the Headquarters, Department of the Army's (HQDA) INRMP Policy Memorandum (21 March 1997), entitled *Army Goals and Implementing Guidance for Natural Resources Planning Level Surveys (PLSs) and Integrated Natural Resources Management Plans (INRMPs).* AR 200-3 "sets forth the policy, procedures, and responsibilities for the conservation, management, and restoration of land and the natural resources thereon consistent with the military mission and in consonance with national policies" (HQDA, 1995). The INRMP Policy Memorandum states that the purpose for completing PLSs and INRMPs is "to ensure that natural resource conservation measures and Army activities on mission land are integrated and are consistent with federal stewardship requirements" (HQDA, 1997).

AR 200-2, *Environmental Effects of Army Actions*, "sets forth policy, responsibilities, and procedures for integrating environmental considerations into Army planning and decision making" (HQDA, 1988). In particular, paragraph 2-6e, *Integration with Army Planning*, states that "environmental analyses and documentation required by this regulation will be integrated as much as practicable with other environmental reviews, laws, and executive orders (Title 40 of the *Code of Federal Regulations* [CFR], Section 1502.25) and . . . installation management plans, particularly those that deal directly with the environment. These include the Natural Resources Management Plans (Fish and Wildlife Management Plan, Forest Management Plan, and Range Improvement or Maintenance Plan)."

This document reflects the commitment set forth by Fort Monmouth to conserve, protect, and enhance the natural resources necessary to support the military mission of the installation. This INRMP will direct the natural resources management program at Fort Monmouth from FY 2000 through FY 2004. In accordance with the aforementioned regulations, the Army has integrated the installation's INRMP and the associated Environmental Assessment (EA) for implementing the INRMP into a single document.

1.1 GOALS AND POLICIES

The general goals of INRMPs outlined in the *Army Environmental Strategic Action Plan* include the following:

- To ensure the long-term sustainability of the lands to support the military mission.
- To protect the natural resources.
- To protect the cultural resources.

- To provide appropriate recreational opportunities.
- To accommodate tenant uses of the land.

The general goals of the INRMP for Fort Monmouth incorporate these Army goals and include the following:

- Support the military mission through care of the land.
- Maintain natural areas of the base to enhance living and working conditions.
- Protect endangered, threatened, and rare plant and animal species.
- Maintain natural resources that support outdoor recreational facilities.
- Enhance soil and water conservation.
- Ensure no net loss of wetlands.

The goals listed above will be integrated with other land uses on the installation, coordinated with other land users to incorporate their guidance, and accomplished under the general policies of the installation. These policies include the following:

- Support the military mission by providing quality facilities and projects through the management and maintenance of land-based areas.
- Provide the Fort Monmouth community with quality living and working environments.
- Use low-maintenance landscaping around living and working facilities.
- Protect communities that sustain or have the potential to sustain endangered, threatened, and rare plant and animal species.
- Ensure that new construction projects preserve natural site features.
- Provide and maintain excellent recreational facilities.
- Protect cultural resources on the installation.

The natural resources management program must remain flexible if it is to achieve long-term success. The program will achieve and maintain this flexibility by incorporating adaptive management techniques into the program. Adaptive management is a process by which new information, from either monitoring data or scientific literature, is used to evaluate the success and appropriateness of current management measures and to make any necessary changes in the management approach to ensure the continued success of the program. The natural resources management program might also be required to adapt to unforeseen changes in military mission and legal requirements.

The natural resources component on Fort Monmouth, which consists primarily of developed, landscaped, and managed grounds and buildings, is small, and little management is necessary. Even on such lands, however, there is an opportunity for management that takes the local flora and fauna and the regional ecological context into account. Therefore, although the focus of this INRMP is on the management of the natural areas that remain on Fort Monmouth, attention is also given to managing the landscaped grounds in a manner such that they contribute to the local ecology. The management measures have been developed based on the current conditions of the resources, as well as the military mission and activities as they are anticipated. This INRMP addresses natural resources management at Fort Monmouth for the next 5 years (FY 2000 through FY 2004) and should provide a solid foundation on which to build the program beyond FY 2004.

1.2 INSTALLATION OVERVIEW

Fort Monmouth is an active installation and the home of Headquarters, Communications Electronics Command (CECOM) Research Development and Engineering Center (RDEC). The Space and

Terrestrial Communications Directorate is one of the directorates that make up the RDEC. The Space and Terrestrial Communications Directorate develops and exploits space-dependent and terrestrial communications technologies in order to satisfy the Army's communication-electronics need in the short-, medium-, and long-term time frames. The Directorate is also the focal point for technology activities related to exploitation of space-dependent or space-based C3IEW systems and associated equipment. The Directorate provides required technical support to Program Executive Officers, Project Managers, and other Army organizations, and to other services and government agencies, in the development, procurement, and fielding of space-dependent and terrestrial communications systems.

The installation contains 638 buildings and has a supporting road network of more than 100 miles. No training ranges or airfields are located on the installation.

1.2.1 Location and Size

Fort Monmouth, New Jersey, is located in Monmouth County near the urban centers of Red Bank, Long Branch, and Asbury Park, and is within commuting distance of the New York metropolitan area (Figures 1-1 and 1-2). Access is convenient by highway, including the Garden State Parkway. Rail passenger transportation is accessible at Little Silver and Red Bank, and rail freight service is available at Red Bank. Airports in the vicinity include Monmouth County Airport and Philadelphia, Newark, John F. Kennedy, and La Guardia International Airports. Military Airlift Command flights originate from McGuire Air Force Base at Wrightstown, New Jersey, which is 50 miles southwest of Fort Monmouth.

The Main Post consists of 637 acres of grounds containing a total of 397 buildings and structures, a supporting road network, and utility systems. The Charles Wood Subpost is situated 2 miles west of the Main Post and contains approximately 464 acres of grounds, 241 buildings and structures, a supporting road network, and utility systems. For exact tract numbers and dates, refer to the drawings performed by the Corp of Engineers dated 20 February 1969, titled *Survey of Fort Monmouth, NJ Property Corners–Ties*, on file in the Fort Monmouth Master Planning office.

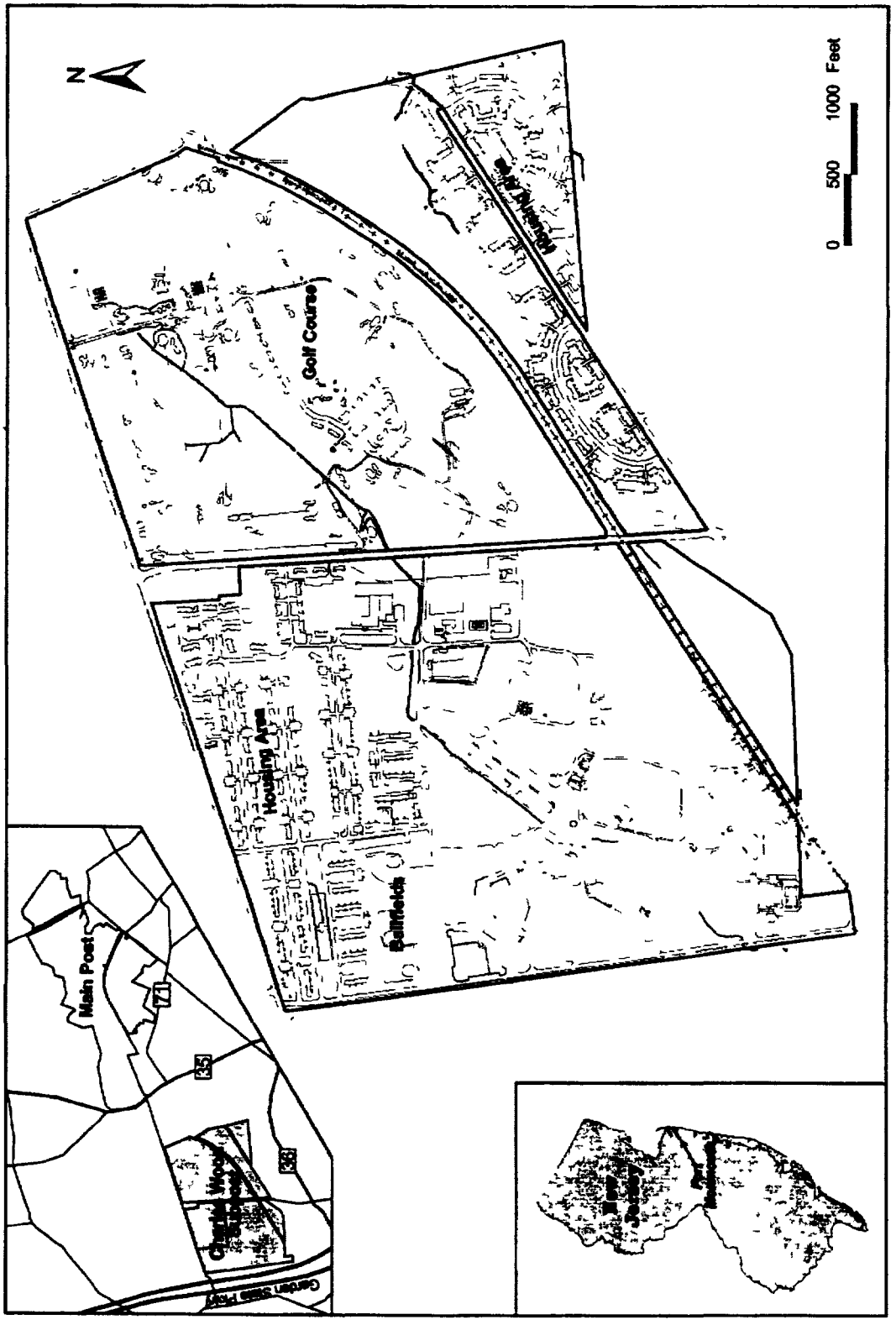
1.2.2 Installation History

Military Mission History. Fort Monmouth (Main Post) lies in the Monmouth Seashore area. As an Army installation, it has constantly advanced in military communications since it was authorized by the Adjutant General on 16 May 1917.

The activation of Fort Monmouth started at the beginning of World War I when the Signal Corps had a requirement for a training center on the eastern seaboard near transportation and preferably near a large port of embarkation. The site leased (445 acres with option of purchase) was a tract of land used by the old Monmouth Park Race Track.

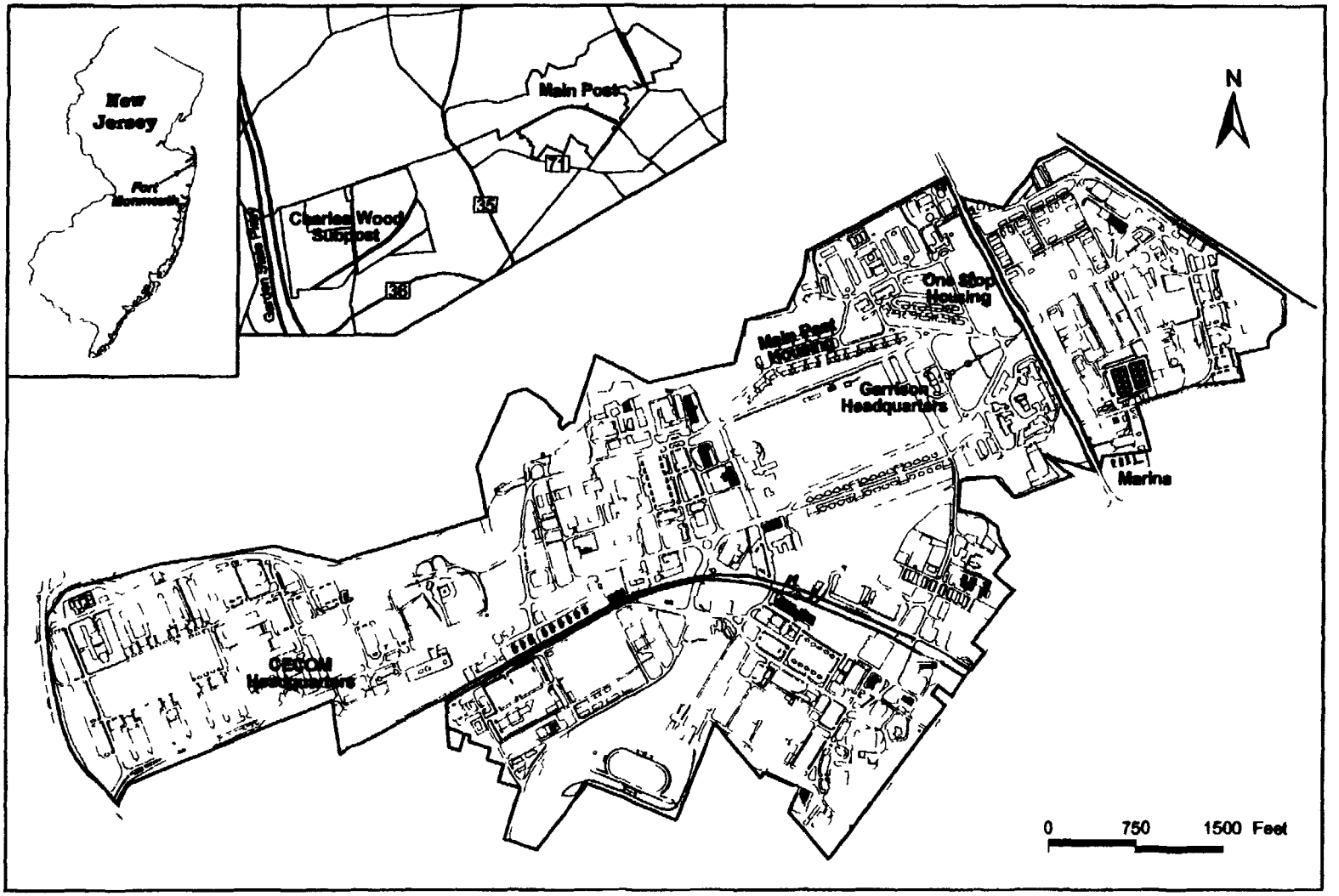
On 4 June 1917, a detachment of troops arrived at the newly established Signal Corps Camp. The installation was renamed Camp Alfred Vail on 15 September 1917. Concurrent with training of Signal Corps troops and construction of wooden barracks to house them during the short period of training, work began on the Signal Corps Radio Laboratory. By the spring of 1918, a complex of 45 buildings had been constructed for the Radio Lab.

On 6 August 1925, the War Department declared Camp Alfred Vail a permanent military installation by officially designating it as Fort Monmouth in honor of the soldiers who fought in the American Revolution Battle of Monmouth in 1778. Construction of permanent buildings was started in 1927. Sidewalks and roads were paved and a street lighting system was installed, giving Fort Monmouth the first positive appearance of permanency.



Charles Wood Subpost Site Map

Figure 1-2



Main Post Site Map

LEGEND

- Building
- Fence
- Installation Boundary
- Road

Source Fort Monmouth, 1999

Figure 1-1

With the outbreak of the Korean War in June 1950, Fort Monmouth scientists concentrated on production engineering of equipment that had been designed since World War II. By the late 1950s and early 1960s, the Signal Research and Development Laboratory was involved with the successful development of the Vanguard 1's electrical power supply, which consisted of solar battery clusters developed by Fort Monmouth scientists. Other high points of the mission of the Fort Monmouth laboratories were the development of a large-scale mobile computer, hand-held radars, Morse code readouts, "colorful" surveillance, multichannel laser relay, Mighty Mite oscillator, fuel cells, and microelectronics.

Under the reorganization of the U.S. Army during 1962, a new concept in Army Research, Development and Materiel Readiness was initiated on 1 August 1962. The United States Army Materiel Command (AMC) came into being on that date as the first centralized logistics command to exist in peacetime. On the same day a major subordinate element of AMC, the Electronics Command, was established and combined with Headquarters, Fort Monmouth.

In May 1981 the Communications Electronic Materiel Readiness Command and Communications Research and Development Command merged to form a new giant in the military logistics field, CECOM. CECOM is working to reduce the complexity in administrative machinery and to gain new control of that machinery while simultaneously maintaining the integrity of the research and development community through the medium of a Research and Development Center within the Command.

Fort Monmouth, recognized for more than half a century as one of the foremost military technological centers in the world, has continued to have a major influence on the history of communications, electronics, meteorology and sciences, and related arts. Operating from the solid base of its accomplishments and traditions, Fort Monmouth will continue to be one of the most vital elements in the defense of our nation and its allies.

Natural Resource Management History. The major thrust of natural resources management in recent years has been grounds management and protection of wetland areas on the Main Post and Charles Wood Subpost. Grounds management includes landscape planting and maintenance of lawns, recreational areas, ammunition storage areas, fields and roadsides, and the golf course. Management guidelines are contained in the Fort Monmouth Installation Design Guide (IDG) (Black and Veatch, 1991). A wetlands delineation was completed on the Main Post and a portion of the Charles Wood Subpost in August 1998 by Versar, Inc. Wetlands on the Charles Wood Subpost not delineated by Versar had been delineated in 1994 by Bellis and Semmens (Versar, 1998). The installation has cooperated with the U.S. Department of the Interior, Fish and Wildlife Service (USFWS) and the New Jersey Natural Heritage Program to identify federally listed endangered and threatened species and rare plants, animals, and natural communities.

Fort Monmouth has never had a fish and wildlife management program. With one exception, hunting, fishing, or trapping have not been pursued because of the lack of fish and wildlife resources. The exception has been intermittent fishing on Husky Brook Lake, which has been stocked with trout for put-and-take fishing. The lake is not large enough to accommodate a public fishing program.

In 1995 a natural resources manager was designated in the Directorate of Public Works (DPW), Engineering Plans and Services Division, Master Planning and Real Property Branch. An Environmental Coordinator works under the supervision of the Director of Public Works.

1.2.3 Neighbors

Fort Monmouth is located in the densely populated northern New Jersey area. The installation is surrounded on three sides by residential and light industrial areas and on the east by tidal creeks that border both the installation and a small, contiguous peninsula of residential land.

1.2.4 Satellite Installations

No other installations or lands are directly affected by this INRMP.

1.3 RESPONSIBLE AND INTERESTED PARTIES

The success of the management of the natural resources on the grounds of Fort Monmouth and the implementation of this INRMP requires a cooperative effort among the parties directly responsible. The level of success can be enhanced by developing partnerships among other parties that have a vested interest in the responsible management of the natural resources at Fort Monmouth. A brief description of the parties directly responsible for the implementation of this INRMP, as well as other interested parties, is provided in the following sections.

1.3.1 Fort Monmouth

The installation commander is responsible for the stewardship of natural resources at Fort Monmouth. Under the INRMP, DPW is assigned the primary responsibility of natural resources management, and the Chief of Master Planning is responsible for development, implementation, and 5-year revision of the plan. The primary duties of the Environmental Coordinator involve compliance, coordination, and integration of the plan with other elements of the environmental program. Compliance is inclusive of all state and federal laws, including the Endangered Species Act (ESA), Sikes Act, Clean Water Act (CWA), and National Environmental Policy Act (NEPA).

Grounds maintenance involves numerous tasks assigned to several parties, chiefly by contract. Most of the grounds maintenance is performed by a commercial activities contractor, and general pest management (including herbicide applications) is under a contract developed and administered by the Facility Management Branch of the Contract Management Division (CMD). The Base Operations Branch of the CMD performs contract surveillance and ensures performance.

Golf course maintenance is the responsibility of a professional golf course superintendent employed by Community Family Activities through nonappropriated fund instrumentalities.

Housing residents contribute to grounds maintenance by mowing the grass around their dwellings and landscaping their residence sites with approved installation landscape plans.

1.3.2 Other Defense Organizations

Fort Monmouth is served by the U.S. Army Corps of Engineers (USACE), New York District. The USACE, Mobile District is providing contractor support for the preparation of the INRMP and EA for Fort Monmouth.

1.3.3 Federal Agencies

USFWS provides signatory agreement concerning the conservation, protection, and management of the fish and wildlife resources presented in the INRMP. USFWS is the primary federal agency for issues

regarding fish and wildlife management, as well as the regulatory authority for the ESA and the Migratory Bird Treaty Act (16 U.S.C. §§ 703-711).

1.3.4 State Agencies

The New Jersey Division of Fish, Game, and Wildlife (NJDFGW) is responsible for natural resources management throughout the State of New Jersey. NJDFGW is notified any time an activity at Fort Monmouth has the potential to affect the natural resources of the installation or the surrounding areas. NJDFGW provides signatory agreement on such activities. The state of New Jersey's Natural Heritage Program, established in 1984 through a cooperative agreement between The Nature Conservancy, a private conservation organization, and the New Jersey Department of Environmental Protection, supports endangered and threatened species conservation through inventories of the state's most significant natural areas and maintenance of the Natural Heritage Database, which contains information on the distribution, biology, status, and preservation needs of endangered, threatened, and rare species and communities. Fort Monmouth cooperates with the Natural Heritage Program in species conservation efforts.

1.4 NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE AND INTEGRATION

1.4.1 National Environmental Policy Act of 1969

Under NEPA, federal agencies take into consideration the environmental consequences of proposed major actions. The intent of NEPA is to protect, restore, or enhance the environment through well-informed federal decisions. This act is premised on the assumption that providing timely information to decision makers and the public concerning the potential environmental consequences of proposed actions will improve the quality of federal decisions. Thus, the NEPA process includes a systematic, interdisciplinary evaluation of potential environmental consequences expected to result from implementation of a proposed action.

The Council on Environmental Quality (CEQ) was established under NEPA to implement and oversee federal policy in this decision-making process. To this end, the CEQ has issued *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR Parts 1500-1508). The CEQ regulations specify that an EA must be prepared to:

- Briefly provide evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FNSI).
- Aid in an agency's compliance with NEPA when an EIS is unnecessary.
- Facilitate preparation of an EIS when one is necessary.

In addition, according to CEQ regulations (40 CFR 1500.2(c)), NEPA's requirements should be integrated "with other planning and environmental review procedures required by law or by agency practice so that all such procedures run concurrently rather than consecutively."

1.4.2 Army Regulations 200-2 and 200-3

AR 200-2, *Environmental Effects of Army Actions*, provides Army guidance and procedures for complying with NEPA and sets forth policy for integrating environmental considerations into Army planning and decision making. Embodying the intent and spirit of NEPA, AR 200-2 directs installations to integrate environmental analyses and documentation as much as practicable with other environmental reviews, laws, and Executive Orders. This regulation specifically identifies the Natural Resources Management Plan as a type of document that should be reviewed before implementation. Therefore, the requirements of AR 200-2 must be addressed in the context of assessing the potential environmental

effects of a proposed action to *implement* a Natural Resources Management Plan once it has been developed.

Natural Resources Management Plans are developed in accordance with AR 200-3, *Natural Resources Land, Forest, and Wildlife Management*, which provides Army guidance and procedures for the protection of natural resources, including conservation, management, and restoration. AR 200-3 states that "the appropriate level of environmental documentation will be determined based upon requirements set forth in NEPA and AR 200-2 on an installation by installation basis." AR 200-3 further states, "It is Army policy to integrate environmental reviews concurrently with other Army planning and decision-making actions to avoid delays in mission accomplishments." The INRMP Policy Memorandum (HQDA, 1997) states that with regard to NEPA requirements, "implementation of the INRMP shall serve as the proposed action and NEPA documentation should be scoped to address appropriate alternatives and issues."

1.4.3 INRMP and NEPA Integration

In the past, the Army and other Department of Defense (DoD) agencies prepared NEPA analysis and documentation for proposed actions to implement plans such as INRMPs *after* the plans were developed. Although that approach complies generally with NEPA regulations and policies, it is cumbersome and often results in the inefficient repetition and redundancy associated with developing completely separate documents.

AR 200-2, *Environmental Effects of Army Actions*, Chapter 2, Section 2-6(e), states that "Environmental analyses and documentation required by this regulation will be integrated as much as practicable with other environmental reviews . . . (40 CFR 1502.25)." Section 2-6(e)(5) identifies as falling into this category "Installation management plans, particularly those that deal directly with the environment. These include the Natural Resources Management Plans (Fish and Wildlife Management Plan, Forest Management Plan, and Range Improvement or Maintenance Plan)."

CEQ regulations encourage combining NEPA documents with other agency documents to reduce duplication and paperwork (40 CFR 1506.4) so that agencies can focus on the real purpose of the NEPA analysis—making better decisions. This philosophy is supported by Army leadership, the U.S. Environmental Protection Agency (EPA), and the CEQ.

Recognizing the efficiencies in cost and time that could be realized from a fully integrated approach to the planning development process, USACE has, for several years, regularly and successfully combined its Civil Works project plans and their required NEPA documents, typically during the project Feasibility Study phase. In addition, the *Habitat Conservation Planning Handbook*, developed in a joint effort between USFWS and the U.S. Department of Commerce, National Marine Fisheries Service, strongly recommends combining Habitat Conservation Plans and their NEPA analyses to streamline the planning process. This handbook states that "the process should be streamlined by integrating the analyses in the same document, to the extent possible, by running the process concurrently, not consecutively, and by conducting joint processes with other agencies as applicable."

Army guidelines recommend that the INRMP and its associated NEPA analysis and documentation be prepared concurrently. In an effort to alleviate the drawbacks of preparing sequential documents and to streamline the overall process, Fort Monmouth has fully integrated the INRMP and its associated NEPA analysis and documentation into a single report. Combining an INRMP and its associated EA is an alternative approach for integrating environmental analyses and documentation. This document has been prepared using the concurrent and fully integrated NEPA analysis approach. This approach embraces the intent and spirit of NEPA, as well as the requirements of AR 200-2 and AR 200-3. The resultant planning

assessment includes a comprehensive description, analysis, and evaluation of all environmental components at a given location. Additionally, it formalizes existing natural resource practices and can be used as an effective tool for future planning and decision-making purposes.

The INRMP portion of the document provides management measures that have been developed by considering various alternatives for meeting resource-specific goals and objectives at Fort Monmouth. The INRMP also provides the rationale for why certain management measures have been selected for implementation and others have not, based on analysis of resource-specific screening criteria. The EA portion of the document carries forward the INRMP's selected management measures as the proposed action. Since other management alternatives were considered and dismissed from further consideration in developing the INRMP, the EA addresses only the proposed action and a no action alternative.

To readily identify elements of the NEPA analysis, Table 1-1 lists the elements of the required NEPA analysis and where they are incorporated into this document. All remaining sections pertain primarily to the INRMP.

1.4.4 Purpose of and Need for the Proposed Action

The purpose of the proposed action is to enable Fort Monmouth to manage the use and condition of natural resources located on the installation effectively. Implementation of the proposed action would support the installation's mission and need to comply with environmental regulations and policies.

1.4.5 Description of the Proposed Action and Alternatives

Proposed Action. The proposed action is to implement the INRMP for Fort Monmouth, New Jersey. This action would meet the installation's need to support its military mission and maintain the grounds and natural resources of the installation in compliance with environmental regulations and policies. The proposed action applies to the properties of the installation only. The INRMP is meant to be modified over time as the needs and mission of the installation change. The proposed action focuses on a 5-year planning period, which is consistent with the time frame for the management measures described in the INRMP. Implementation of the INRMP involves putting into practice, to the maximum extent practicable, the management measures presented in Section 5.8, Integration and Summary of Management Measures. Additional environmental analyses may be required as new management measures are developed over the long term (beyond 5 years). Implementation of some INRMP-related projects also may require evaluation to determine the need for and appropriate level of NEPA documentation.

Alternatives. Alternatives considered for the management of Fort Monmouth's natural resources are described and evaluated within those sections of this document that address the ecosystem-based management of each specific resource (see Section 5.0). The development of selected management measures for the INRMP involved a screening analysis of resource-specific management alternatives. The screening analysis involved the use of accepted criteria, standards, and guidelines (e.g., the Natural Conservation Service's *National Soils Handbook*; EPA's *Lake and Reservoir Restoration Guidance*), when available, and best professional judgment to identify management practices for achieving Fort Monmouth's natural resource management objectives. Consistent with the intent of NEPA, this process focused on considering a reasonable range of resource-specific management alternatives and, from those, developing a plan that could be implemented, as a whole, in the foreseeable future. It then dropped from detailed analysis management alternatives deemed to be infeasible. The outcome of the screening analysis was the management measures contained in the INRMP. Alternative management measures considered during the screening process, but not analyzed in detail, are discussed in Section 5.0, as is the rationale for their not being selected. Application of this screening process eliminated the need to define

Table 1-1
Required NEPA Analysis Elements and Corresponding INRMP Sections.

Required NEPA Analysis	Corresponding INRMP Section
The Executive Summary briefly describes the proposed action, environmental consequences, and mitigation measures.	Provided immediately preceding Section 1.0
The Purpose of and Need for the Proposed Action summarizes the proposed action's purpose and the need for the action and describes the scope of the environmental impact analysis process.	Section 1.4.4
Description of the Proposed Action and Alternatives describes the proposed action of implementing the INRMP (the selected management measures) and an alternative to implementing the proposed action (the no action alternative).	Section 1.4.5 Section 5.0 (Natural Resources Management)
Scope of Analysis describes the scope of the environmental impact analysis process.	Section 1.4.6
Affected Environment describes the existing environmental setting.	Section 3.0
Environmental Consequences identifies potential environmental effects of implementing the proposed action and the no action alternative.	Section 7.0
Conclusions identifies potential impacts associated with the alternatives and draws a conclusion as to which alternative should be implemented.	Section 8.0
References provides bibliographical information for cited sources.	Follows Section 8.0
List of Preparers identifies persons who prepared the document and their areas of expertise.	Follows References
Distribution List indicates recipients of the EA.	Follows List of Preparers
The Appendices include agency consultation letters and supplemental information.	Follows Distribution List

and evaluate hypothetical management alternatives. As a result, the EA, made an integral part of this document, formally addresses only two alternatives, the proposed action (implementation of the INRMP and all of the preferred resource management strategies) and the no action alternative, described below.

No Action Alternative. This document refers to the continuation of existing (baseline) conditions of the affected environment, without implementation of the INRMP, as the no action alternative. Implementation of the no action alternative would mean that natural resources at Fort Monmouth would continue to be managed as they currently are, with no implementation of the management measures in this INRMP that differ from current practices. Inclusion of a no action alternative is prescribed by CEQ regulations; the no action alternative serves as a benchmark against which proposed federal actions can be evaluated.

1.4.6 Scope of Analysis

The potential environmental effects associated with the proposed action must be assessed in compliance with NEPA, regulations of the CEQ, and AR 200-2. This EA identifies, documents, and evaluates the effects of implementing the INRMP at Fort Monmouth. As discussed, this EA examines the Army's preferred alternative (the proposed action as described in Sections 1.4.5 and 5.0) and a no action alternative (see Section 1.4.5).

The analysis provides an objective evaluation of the environmental consequences of implementing this INRMP for Fort Monmouth with respect to the following goals:

- Meeting military mission requirements.
- Achieving natural resource management goals.
- Meeting legal and policy requirements, including those associated with NEPA, that are consistent with current national natural resources management philosophies.

To meet this objective, an interdisciplinary team of environmental scientists, biologists, planners, economists, engineers, archeologists, historians, and military technicians developed the INRMP and EA. The team identified the affected environment; analyzed the proposed action with respect to existing environmental conditions, the military mission at Fort Monmouth, and mission-related activities at the installation; and determined the potential beneficial and adverse effects on these conditions and activities associated with the proposal.

1.4.7 Interagency Coordination and Review

Interagency participation is invited throughout the process for developing the INRMP. Once the INRMP has been drafted, the EA may be used as a tool to inform decision makers and the public of the likely environmental and socioeconomic consequences of implementing the proposed action and alternatives. In addition, Fort Monmouth provides for public participation in the NEPA process to promote open communication and better decision making. Public participation is invited throughout the NEPA process for developing the EA portion of the document. The following discussion describes agency and public involvement for this project.

Interagency Coordination. On 24 and 25 May 1999, a project kickoff and coordination meeting was held at Fort Monmouth, New Jersey. The purpose of the meeting was to establish formal communications between representatives of Fort Monmouth and the contractors charged with preparation of the INRMP and EA, and to address any concerns regarding their preparation. Attendees discussed the objectives and scope of the INRMP and NEPA analysis, the approach for conducting the INRMP and NEPA analysis, agency coordination, data sources, and project scheduling. A tour of Fort Monmouth was conducted at the same time that the kickoff meeting was held. Fort Monmouth personnel were also interviewed and data were collected.

On 10 June 1999 the state of New Jersey's Natural Heritage Program was contacted with respect to the occurrence of sensitive species in Monmouth County. On 19 July 1999, an agency coordination letter was mailed to the regional office of USFWS. The letters officially notified these entities of Fort Monmouth's intent to prepare an INRMP. Copies of these letters and the letters of response to these requests are contained in Appendices A (U.S. Fish and Wildlife Service Correspondence) and B (State of New Jersey, Natural Heritage Program Correspondence).

Project Review and Comment. The primary responsible agencies (see Distribution List following Section 8.0) were provided an opportunity to review and comment on the initial draft INRMP/EA

completed on 30 September 1999. The reviewers' comments were incorporated into the document, and the draft final document was distributed to those agencies for additional review and comment on 22 November 1999. Comments on the draft final have been incorporated into this final INRMP/EA. The approving authority has prepared and signed a FNSI.

Public Participation. The public and concerned organizations, including minority and low-income, disadvantaged, and Native American groups, were notified of the findings and conclusions of the EA through publication of a Notice of Availability (NOA) of the document in a local newspaper and the availability of the INRMP/EA for public review for 30 days before initiation of the proposed action. The NOA was published in January 2000 in the *Asbury Park Press*, a widely circulated local newspaper published in Neptune, New Jersey. The INRMP/EA was also made available for public review at the Monmouth County Library, Eastern Branch, in Shrewsbury, New Jersey.

SECTION 2.0: MILITARY MISSION

2.1 MILITARY MISSION

Fort Monmouth's primary mission is to provide command, administrative, and logistical support for CECOM. CECOM is a major subordinate command of AMC and is the host activity. Tenant activities use the support provided in the performance of research, development, procurement, and production of electronic materiel for use by the United States Armed Forces. Other missions include the provision of administrative training and logistical and related support necessary to transition selected reserve component units into the active force structure in the event of a national emergency. This installation also serves as host command and provides support functions to approximately 28 tenant activities.

Mission functions of the two subareas of Fort Monmouth are as follows:

- The Main Post occupies 637 acres and provides supporting administrative, training, and housing functions as well as many of the community and industrial facilities for Fort Monmouth.
- The Charles Wood Area occupies 464 acres and is used primarily for research and development, testing, housing, and recreation.

2.2 RELATIONSHIP BETWEEN THE MILITARY MISSION AND NATURAL RESOURCES

In general, the natural resources present on the installation and their management have no impact on the military mission of Fort Monmouth. The grounds of the installation are not used for military training, and the nature of the activities that occur at Fort Monmouth is such that their conduct has no impact on natural resources. No federally listed endangered, threatened, or rare plant or animal species are known to exist on Fort Monmouth, so special protective measures for such species are not necessary. Wetlands and cultural resources have been identified on the installation and their protection is required. Compliance regarding these latter resources falls under the CWA and National Historic Preservation Act (NHPA), respectively.

2.3 FUTURE MILITARY MISSION IMPACTS ON NATURAL RESOURCES

Changes in the military mission of Fort Monmouth are not expected to occur within the next 5 years. Therefore, no future impacts on natural resources resulting from conduct of the military mission are anticipated.

SECTION 3.0: AFFECTED ENVIRONMENT

3.1 ECOREGION AND LOCAL SETTING

The U.S Fish and Wildlife Service, Region 5, has established ecoregions for the Northeastern United States. Fort Monmouth lies in the Hudson River/New York Bight ecoregion, a vast, interconnected system of ocean, coastal, riverine, and upland areas nearly 40,000 square miles in extent (USDOI, 1999). It comprises the marine waters of the New York Bight and the watershed feeding into the bight, dominated by the 320-mile Hudson River. The watershed is geologically complex and biologically rich from the barrier beaches and tidal marshes of the Atlantic coastal plain to the alpine communities in the high peaks of the Adirondack Mountains. It is also demographically and culturally diverse, including both the densely populated urban core of New York City and the sparsely populated forested and agricultural outlying areas.

Forming the coastal fringe of the New York Bight, the 225-mile system of barrier beaches and back barrier lagoons along the Atlantic coast of New Jersey and Long Island supports more than 20 species of colonial nesting waterbirds. These species include the federally endangered roseate tern (*Sterna dougalli*) and threatened piping plover (*Charadrius melodus*) and significant concentrations of wintering waterfowl, including 80 to 85 percent of the brant (*Branta bernicla*) population and about 45 percent of the American black duck (*Anus rubripes*) population. The rich food resources of the marshes, tidal flats, and beaches along the coast support hemispherically significant concentrations of migratory shorebirds. The bays, inlets, and nearshore waters of the New York Bight are nursery and feeding areas for many commercially and recreationally important shellfish and finfish species and several species of federally listed endangered sea turtles and marine mammals. Several plant species and communities are endemic to the area, including the world's only dwarf pitch pine (*Pinus rigida*) communities, as part of the New Jersey Pinelands, Long Island Pine Barrens, and Shawangunk Ridge (USDOI, 1999).

The ecosystem is subject to extreme social and economic use impairments and severe ecological impacts as a result of industrial effluents; chemical and oil spills; human sewage; urban, suburban, and rural runoff; recreational overcrowding; floatable materials; atmospheric fallout of pollutants; dredging and dredge material deposition; overharvesting of fishery resources; introduction of exotic species; loss of essential natural habitats; and other causes. Yet in spite of such severe environmental stresses and loss of habitats, the Bight and its adjacent shorelands and uplands within the watershed continue to be rich in living resources, many of which are of significant economic and social value to the region's more than 20 million people. There is perhaps no other major ecosystem in the country in which the human component has been and continues to be so integral to the present and future viability of habitats and species.

Fort Monmouth is included in the North Coast Environmental Planning Region of Monmouth County, New Jersey. Division of the state into planning regions permits the state to work closely with municipalities to improve regional resource preservation, protection, and improvement efforts. The Environmental Planning Section of the Monmouth County Planning Board completed a North Coast Region Ecological Resource Inventory in 1999. The inventory contains detailed information on land uses; land cover; habitats, historic, agricultural, and coastal resources; soils, geology, and topography; surface water resources; and vegetation.

Fort Monmouth is located in the east-central portion of New Jersey in Monmouth County, approximately 50 miles south of New York City and 70 miles northeast of Philadelphia. The Main Post is generally bounded by State Highway 35 to the west, Parkers Creek to the north, the New Jersey Transit railroad to the east, and residential neighborhoods to the south. The Charles Wood Subpost is bounded by Pearl

Harbor Road to the west, Tinton Avenue to the north, Maxwell Road to the east, and the Conrail railroad tracks to the south.

The Main Post of Fort Monmouth is geographically located within the coastal area of New Jersey. As provided in the Coastal Zone Management Act, federal lands, including Fort Monmouth, are excluded from New Jersey's Coastal Zone Regulations (NJAC Chapter 7E). Although federal lands are excluded from a state's coastal zone, New Jersey has the authority to review activities on federal lands when the activities have spillover impacts that would significantly affect the state's coastal zone. The Charles Wood Subpost is not located within the New Jersey coastal zone (NJAC 13:19-1 et seq.).

3.2 CLIMATE

Fort Monmouth is situated in the temperate zone of the middle Atlantic states, creating a moderate temperature variation and range on a yearly basis. Humidity is high in the area because of the proximity to the Atlantic Ocean, and as a result, summers are relatively cooler and winters milder than elsewhere at the same latitude. Weather conditions are affected by northwest and southwest winds. Normal ocean temperatures range from an average near 37 degrees Fahrenheit (°F) in January to near 72 °F in August. The coldest temperatures occur in January, ranging from 23 to 41 °F, but winter temperatures rarely fall below 0 °F. Summer temperatures range from 65 to 84 °F and frequently reach 90 °F from late May through early September.

The precipitation at Fort Monmouth is considered moderate, with an average monthly rainfall or snow and rain mixture of 3.5 inches and an annual average of 45 inches per year. Summer thunderstorms occasionally combine high winds with heavy rainfall, though destructive storms are infrequent in Monmouth County. Heavy rains have occurred in connection with hurricanes, which sometimes move northward along the mid-Atlantic coast. The average date of the last freezing temperature in spring is 20 April and of the first freeze in autumn is 19 October. The average seasonal snowfall for Monmouth County is 25 inches; at least 1 inch of snow is present on the ground an average of 9 days a year.

3.3 LAND USE AND AIRSPACE USE

The Main Post provides supporting administrative, training, and housing functions, as well as many of the community and industrial facilities for Fort Monmouth. These facilities are distributed across the property, with no distinct clustering of functions. The Charles Wood Subpost is used primarily for research and development, testing, housing, and recreation. Research, development, and testing facilities occupy the southwest corner of the subpost, residential areas are located in the northwest corner and along the southeastern boundary, and the golf course occupies the northeast corner. Both the Main Post and the Charles Wood Subpost contain ample green space.

The areas surrounding Fort Monmouth are characterized by a mixture of residential, commercial, and light industrial uses. Because federal facilities are not subject to local planning and zoning regulations, zoning restrictions of the surrounding townships and boroughs do not apply to Fort Monmouth. A review of the land use plans for the surrounding municipalities shows that land uses in the surrounding municipalities are compatible with those along the inside perimeter of the Main Post and Charles Wood Subpost.

There are no designated ranges at Fort Monmouth. The only designated training area is on the Main Post—Building 1204 and 3.8 acres of grounds surrounding the facility, which is used for classroom-type training activities.

There are no restrictions on the airspace over Fort Monmouth.

3.4 AIR QUALITY

Fort Monmouth has three types of emission sources: fossil-fuel-burning boilers, volatile organic materials storage (primarily gasoline storage tanks), and vehicles. The New Jersey Department of Environmental Protection (NJDEP) has issued a Title V Air Operating Permit for the operation of the installation's heating plant boilers. Proper storage of volatile organic materials in accordance with applicable federal, state, and local laws and regulations minimizes potential emissions from that source category.

Monmouth County, located within the New York-Northern New Jersey-Long Island Air Quality Control Region, monitors carbon monoxide, inhalable particulate matter, and ozone as part of its air quality monitoring program. Based on monitoring results, Monmouth County is classified as an ozone non-attainment area. This classification indicates that the county does not meet federal and state air quality standards for ozone.

3.5 NOISE

Noise sources at Fort Monmouth consist of helipad operations, roadway traffic, and general activities associated with office and residential developments. Fort Monmouth does not have high-amplitude impulsive noise resulting from armor, artillery, and detonation activities or noise from small arms ranges.

The Army's Installation Compatible Use Zone (ICUZ) program, set forth in Chapter 7 of AR 200-1, implements federal law concerning environmental noise generated by Army activities. The ICUZ program defines three noise zones:

- Zone I - compatible (the majority of people adapt to these noise levels).
- Zone II - normally incompatible (some people find it difficult to adapt to these noise levels).
- Zone III - incompatible (most people would find it difficult to adapt to these noise levels).

These compatibility zones are used for land use planning to prevent conflicts with noise-sensitive land uses, such as residential housing and hospitals.

Based on an evaluation of potential noise studies performed by the U.S. Army Environmental Hygiene Agency (AEHA), now the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), operations at the helipads are the only installation-generated noise source with the potential to cause annoyance to the nearest sensitive receptors. The AEHA further concluded that, based on day/night averaging, the small numbers of helicopter flight operations per month, and the location of the helipads, Zones II and III (as defined above) do not extend beyond Fort Monmouth (HQDA, 1991).

3.6 WATER QUALITY

The Installation Assessment of Fort Monmouth (USATHMA, 1980) described poor water quality conditions for Mill Brook and Lafetra Creek. Local industrial operations upstream of the Charles Wood Subpost discharge into Mill Brook, and light industry and a large shipping center discharge into Lafetra Creek upstream of the Main Post. Husky Brook receives storm drainage and drainage from apartment complex sump pumps before entering the Main Post. Water quality in Husky Brook Lake is generally poor, probably because of contamination from off-site sources and an overabundance of nutrients from Canada goose (*Branta canadensis*) droppings.

3.7 TOPOGRAPHY

Both the Main Post and Charles Wood Subpost are nearly level except for short, steep slopes along streams and waterways. Elevations at the Main Post range from about 6 feet above mean sea level (msl) at stream edges to 30 feet above msl near the center of the post. Elevations at Charles Wood Subpost range from about 27 to 60 feet above msl; the lowest elevations are along Wampum Brook near the eastern property boundary (USATHMA, 1980).

3.8 GEOLOGY

3.8.1 Stratigraphy

Monmouth County is within the Atlantic Coastal Plain physiographic province, which is underlain by unconsolidated sediments of the Mesozoic and Cenozoic Ages (Harland Bartholomew and Associates, 1984). The coastal plain sediments are primarily of marine and continental origin. The sediments consist mainly of sands, silts, and clays and greensands or glauconite sands with interspaced gravel beds. Strata of iron-cemented sandstone are locally present. A thin veneer of sand, clay, and gravel deposits of more recent age overlies the older coastal plain sediments. This layer is less than one million years old and was deposited by outwash or meltwater from the glacial ice that covered land as far south as northern New Jersey.

3.8.2 Seismicity

Earthquakes that have occurred or been felt in New Jersey have been caused by fault movements of the North American tectonic plate (Dombrowski, 1992). Monmouth County is located near the Raritan Bay-New York Bight area of seismic activity, one of the three general areas in New Jersey from which seismic activity has been reported. Between 1663 and 1990 eight earthquakes were recorded with an epicenter in Monmouth County or immediately offshore from Monmouth County. Earthquakes recorded in Monmouth County have generally ranged between 1 and 3 on the Richter scale. An earthquake with a magnitude of 3.1 and the epicenter in Keyport occurred on August 2, 1980. An earthquake of this magnitude causes vibrations like that of a passing truck and is largely unnoticed by the general population. There are no records of significant earthquake damage in New Jersey.

3.9 SOILS

The soils of both installation areas may be generally described as the Freehold-Urban Land Holmdel-Urban Land Complex association. Many of the soils are mapped as altered soil types. Soils within the Main Post are primarily mapped as Udorhents, which consist of areas of soils that have been altered by excavating or filling. The primary soil types in the Main Post are Freehold sandy loam, Downer sandy loam, and Kresson loam. Freehold and Downer are somewhat well drained soils that occur on upland areas; Kresson is a poorly drained soil that also occurs on upland areas (USDA, 1989). The Charles Wood Subpost has sandy loams of the Freehold, Shrewsbury, and Holmdel types. Shrewsbury is a hydric soil; Kresson and Holmdel are hydric due to inclusions of Shrewsbury. Downer is not generally hydric, but can be. An excellent county soil survey was published in 1989 and is available at the Master Planning office for reference.

The Soil Survey of Monmouth County, New Jersey (USDA, 1989) provides information on the degree and types of soil limitations that might affect shallow excavations (such as basements and trenches for utility lines), small dwellings, and small commercial buildings. Both the Freehold and Downer soil types have slight limitations for dwellings and small commercial buildings and severe limitations for shallow excavations. The severe limitations of these soils are due to the tendency of the walls of excavations to

cave in. The Kresson soil type has severe limitations for excavations, dwellings, and small commercial buildings. The severe limitations of this soil type are associated with wetness. Neither the Main Post nor the Charles Wood Subpost is classified as "lands suitable for cultivation" by the Monmouth County Soil Conservation District (Harland Bartholomew & Associates, 1984).

3.10 PETROLEUM AND MINERALS

There are no petroleum or mineral resources on the Main Post or Charles Wood Subpost.

3.11 WATER RESOURCES

3.11.1 Surface Water

Several waterways, which generally flow from west to east, drain the Main Post. Mill Brook enters Fort Monmouth along the southwest boundary and flows east and then north to Lafetra Creek. Lafetra Creek originates west of the Main Post and flows east along the northern boundary of the Main Post. Parkers Creek originates at the confluence of Lafetra Creek and Mill Brook and flows along the northern boundary of the Main Post until it discharges to the Shrewsbury River. Parkers Creek is a shallow tidal creek with an average depth of 3 feet at high tide (Harland Bartholomew and Associates, 1984).

The southern portion of the Main Post is drained by Husky Brook, a freshwater stream that originates southwest of the Main Post. A portion of the stream has been dredged, widened, and dammed to form a lake (Husky Brook Lake) used for recreational purposes. Downstream from the lake, Husky Brook is piped for approximately 1,100 feet before it surfaces and flows east into Oceanport Creek. Oceanport Creek is a tidal stream that flows along a portion of the southern boundary of the Main Post before discharging into the Shrewsbury River. Fort Monmouth periodically drains a portion of Oceanport Creek east of the Oceanport Avenue Bridge to maintain a marina for Fort Monmouth personnel (Harland Bartholomew and Associates, 1984). The lower reaches of Husky Brook and Parkers Creek are brackish, and water levels in streams on the Main Post fluctuate with the natural twice-daily tide (ATC Associates, 1999).

The southern portion of the Charles Wood Subpost is drained by Wampum Brook and a drainage ditch along the railroad tracks, both of which originate just west of Hope Road and flow east to unite near the eastern boundary of the subpost. This stream continues east as Mill Brook. Mill Brook flows northeast through the golf course from the western boundary of the subpost and joins Wampum Brook east of the subpost (Harland Bartholomew & Associates, 1984).

3.11.2 Groundwater

The water table is relatively shallow at the installation and fluctuates with the tidal action in Parkers and Oceanport creeks at the Main Post. The depth to groundwater on the installation is between 5 and 12 feet (USATHMA, 1980).

The Hornerstown sand is a body of relatively impermeable soil that is capable of slowly absorbing water. The Hornerstown sand acts as an upper boundary of the Red Bank aquifer, but it might yield enough water within its own outcrop to supply individual household needs (HQDA, 1994).

The Red Bank sand outcrops along the northern edges of the installation. The Red Bank contains two members, an upper sand member and a lower clayey sand member. The upper sand member functions as the aquifer, but because of erosion prior to deposition of the Hornerstown, it terminates down-dip within 6 to 10 kilometers of its outcrop. The upper sand member is probably present on some of the surface of

the Main Post and at a shallow depth below the Charles Wood Subpost. The Red Bank sand supplied many domestic wells with water at one time (USATHMA, 1980).

Rainwater and melting snow recharge the Hornerstown deposits below the installation. Recharge from rainfall, melting snow, surface runoff, or bodies of water may occur in the upper member of the Red Bank aquifer (USATHMA, 1980).

3.12 INFRASTRUCTURE

3.12.1 Potable Water Supply

The New Jersey American Water Company supplies potable water to the installation with no quantity limitation. Water is supplied through three metering stations at the Main Post. These metering stations have a total delivery capability of 3.8 million gallons per day (mgd). Two additional stations can be activated if additional demand is anticipated and can supply an additional 3.9 mgd, thereby effectively doubling the total delivery capability. Current demand at Fort Monmouth is well within the existing system capacity.

3.12.2 Storm Water Management

An extensive storm water drainage system was constructed on the installation about 50 years ago. The system was designed to supplement the natural drainage and prevent localized flooding. The storm water drainage system discharges at various points into Wampum Brook, Husky Brook, Husky Brook Lake, Lafetra Creek, Mill Brook, Parkers Creek, and Oceanport Creek. Because of the age of the system, many pipes and catch basins are in need of repair, and maintenance and repair of the system occurs as necessary. The storm drainage system in the 600 area of the Main Post adequately carries storm water drainage and is not subject to flooding. Some of the storm water drainage system outfalls on the Main Post are below the elevation of the mean high tide, particularly along Oceanport Creek and Parkers Creek. Thus, during high tides water backs up into the storm water drainage system (Harland Bartholomew and Associates, 1984). The extreme southeastern portion of the Main Post is subject to flooding during high tides combined with heavy rains (USATHMA, 1980). The Charles Wood Subpost is identified as an area of undetermined, but possible, flood hazard in the Borough of Eatonton, New Jersey, Flood Insurance Rate Map (FEMA, 1981). However, the 100-year base flood elevation for Wampum Creek at the eastern boundary of the subpost is 26 feet, while ground elevations at the subpost range from 27 to 60 feet above msl.

3.12.3 Wastewater Treatment

Wastewater treatment is provided by the Northeast Monmouth County Regional Sewerage Authority. The average combined flow from the Main Post and Charles Wood Subpost is 0.696 mgd. By contract between the installation and the sewerage treatment facility, wastewater flows cannot exceed 3.6 mgd. Current flow is well below the flow rate ceiling.

3.12.4 Solid Waste Disposal

Solid waste generated at Fort Monmouth is collected by a private contractor and disposed of at the Monmouth Reclamation Center Landfill in Tinton Falls, New Jersey. The landfill was expanded and has adequate capacity through 2015.

Monmouth County has an extensive recycling program, in which Fort Monmouth participates. Newspapers, corrugated cardboard, high-grade paper, glass, tin, steel, aluminum, concrete, asphalt, yard

waste, asphalt shingles, batteries, and white goods (major appliances such as washing machines) are all recycled. Recyclable waste is picked up by a contractor and transported to the county recycling center at the landfill

3.12.5 Roadways

Key north-south roadways serving the Fort Monmouth area include Hope Road, State Route 35, and Oceanport Avenue State Route 35 is a principal arterial and serves as the primary access from the north and south to the Main Post via the intersection at the West Gate. Oceanport Avenue (County Highway 11) is located along the east side of the Main Post, providing access to the Main Post via Hartman Gate (East Gate). Hope Road bisects the Charles Wood Subpost. East-west roadways serving Fort Monmouth include Tinton Avenue, State Route 71 (Broad Street), Main Street, and State Route 36 (located approximately 1 mile south of Tinton Avenue) Tinton Avenue serves as the primary roadway between the Main Post and the Charles Wood Subpost

The internal roadway network serving the Main Post includes the Avenue of Memories, Saltzman Avenue, Sherrill Avenue, Wilson Avenue, Alexander Avenue, and Murphy Drive These roadways serve as the primary network for providing traffic circulation and access to base activities. The Avenue of Memories, Saltzman Avenue, and Hildreth Avenue tie together to form the principal continuous east-west roadway through the Main Post, in effect connecting the West Gate and East Gate. Access to the Charles Wood Subpost is provided via the Tinton Avenue intersections with Pearl Harbor Drive and Lowther Drive Corregidor Road is the main east-west roadway on the subpost

3.12.6 Incinerators

There are no incinerators on Fort Monmouth An average annual volume of 13,000 pounds of biomedical waste, primarily hospital waste, is collected and removed from Fort Monmouth by a contractor The biomedical waste is subsequently incinerated at a permitted facility off post.

3.12.7 Energy

Jersey Central Power and Light Company supplies electricity to Fort Monmouth through two 34,500-volt, three-phase, 60-hertz transmission lines The power is transformed at two substations on the Main Post. The total capacity of the two substations is approximately 25,000 kilovolt-ampere (kVA) Fort Monmouth averages a per capita peak energy consumption of approximately 1 kVA, and electricity consumption is well within the capacity of the system.

Fort Monmouth uses two different heating fuels—natural gas and propane Natural gas is supplied by New Jersey Natural Gas Company, and although no contractual limit has been established, additional supply is limited to that which can be delivered at current line pressures. The natural gas lines have recently been upgraded and the entire installation converted from fuel oil heating to natural gas heating. The system's pressure capacity is more than adequate to meet the installation's total demand. Propane is supplied by a private contractor with no limit of supply.

3.12.8 Storage Tanks

A total of 73 storage tanks, including 26 residential underground storage tanks (USTs) for heating oil, 16 RCRA (Resource Conservation and Recovery Act) 1 commercial USTs, and 31 aboveground storage tanks, are present on Fort Monmouth. All storage tanks are in compliance with applicable regulations and the installation has implemented an UST management program in accordance with the state's Regulations Implementing the New Jersey Underground Storage of Hazardous Substances Act (NJSA 58P:10).

3.12.9 Projected Changes in Facilities

There are no known projected changes in facilities or planned construction of facilities over the next 5 years that will impact natural resources or their management. Environmental Assessments (EAs) associated with Base Realignment and Closure actions were completed for both the Main Post and Charles Wood Subpost, and no impacts were predicted from these activities (USACE, 1995b, 1996).

3.13 HAZARDOUS AND TOXIC MATERIALS

Numerous substances that can be considered hazardous are stored and used on Fort Monmouth. These substances are primarily petroleum products, solvents, degreasers, paints, and photo developers. All of these materials are stored and handled in accordance with local, state, and federal regulations. Employees using hazardous materials are trained in their proper use, the collection of spent materials, and the ultimate turn-in procedure for such materials.

Fort Monmouth currently collects and recycles waste oils and lubricants generated on the post and ships them off site for recycling. In 1994, Fort Monmouth replaced its halogenated degreasers with less toxic petroleum-based degreasers. Fort Monmouth has reduced its hazardous waste generation through a source reduction program with the following major components:

- *Product/material substitution*: the process of replacing hazardous materials with nonhazardous ones, either in part or total, with the overall goal being to eliminate the generation of hazardous waste or to decrease the toxicity of the waste being generated.
- *Production process redesign and modernization*: the process of developing and using production processes that are of a fundamentally different design and produce less or no hazardous waste.
- *Better operating practices*: the process of providing proper instruction to employees using hazardous materials, ensuring that only the necessary amounts of hazardous materials are being used and that employees work from small containers whenever possible, thereby reducing the likelihood of spills.

3.13.1 Regulated Substances

There are no explosives, radioactive materials, or other regulated substances, other than those discussed above, stored or used at Fort Monmouth.

3.13.2 Contaminated Sites

Suspected hazardous waste sites were initially identified at Fort Monmouth in a 1980 report prepared by the U.S. Army Environmental Center (AEC). The report identified 21 sites on the Main Post and 11 sites on the Charles Wood Subpost with known or suspected hazardous waste materials. A Preliminary Assessment to investigate each of the 32 sites and 8 additional sites identified by DPW and NJDEP was commenced in August 1993 and completed in December 1993. The 32 areas of concern included closed landfills, suspected landfills, a sludge dump, former polychlorinated biphenyl (PCB) transformer sites, former pesticide storage and mixing areas, closed incinerator sites, former sewage treatment plants, neutralization pits, indoor/outdoor small arms ranges, a former training area, and a former temporary hazardous waste storage area.

In December 1995, USACE, Baltimore District, prepared a Final Site Investigation for the Main Post and the Charles Wood Subpost. The following factors were considered before site-specific recommendations were finalized: degree to which regulatory standards were exceeded, environmental media affected, human and ecological receptors, feasibility for cleanup, natural attenuation versus active remediation, and

economic impact. Recommendations listed in the report include long-term surface water and groundwater monitoring, further delineation of contaminants, a remedial design/remedial action for soils and groundwater affected by volatile organic compounds, and several remedial actions involving the removal and disposal of contaminated soil. The report identified 16 sites with contaminant levels above NJDEP's regulatory standards in one or more environmental media and recommendations for each of the 16 areas and 2 others. Since then, remedial investigations, designs, or activities have occurred at all but 1 of the 16 areas of concern. The last site is scheduled for remediation in 2000 (Fort Monmouth, 1999). DPW is monitoring surface water and groundwater quality on a long-term basis at 19 sites on the installation (USACE, 1995a).

3.13.3 Other Toxic or Hazardous Substances

Asbestos. Fort Monmouth completed a post-wide asbestos survey in 1993. Approximately 2.9 million square feet of building space was surveyed for asbestos-containing materials. Buildings found to contain friable (easily crumbled) asbestos and identified as high-risk have been remediated. All of the material was hauled off site and disposed of in an approved facility. Buildings with nonfriable asbestos are not being remediated. Management plans have been implemented to prevent the asbestos from becoming friable and to protect human health and the environment.

Radon. Fort Monmouth completed a post-wide radon survey in 1989. The entire installation was found to have radon levels well below the 4-picocurie action level recommended by EPA.

Polychlorinated Biphenyls. Fort Monmouth has completed an inventory and testing of all electrical transformers on post. All leaking PCB transformers were eliminated before the EPA deadline of October 1990. A total of 107 PCB-contaminated transformers were identified. Of the 107 PCB-contaminated transformers, 21 are in use. None of the remaining transformers are leaking. Fort Monmouth has acquired retrofilling equipment for use in draining and refilling the remaining transformers.

Lead-based Paint (LBP). Fort Monmouth has not completed a post-wide LBP survey. However, based on the age of the World War II-era buildings on the post, it is assumed that all of them contain some LBP. The AEHA (now USACHPPM) concluded, based on sampling of buildings, that there is sufficient evidence to classify demolition debris from Fort Monmouth as nonhazardous. The AEHA survey assumed complete demolition of a facility as opposed to descrete portions thereof that might contain higher concentrations of contaminant materials.

Pesticides. Fort Monmouth has and implements an Integrated Pest Management Plan. A contractor handles all pesticide applications, and no pesticides are mixed on the installation. The pesticides most commonly used by the contracted pesticide applicators include boric acid, pyrethrin, hydramethylonon, acephate, and cypermethrin. Only substances approved by EPA and the NJDEP are used as part of Fort Monmouth's pest control program, and all substances are used in accordance with EPA's recommendations.

Medical and Biohazardous Wastes. The hospital and dental facilities produce approximately 13,000 pounds of medical waste annually. All of this waste is transported off site for incineration at a licensed facility in accordance with local, state, and federal regulations.

3.14 UPLAND HABITATS

Upland habitats on the installation can be divided into two general types—maintained or developed, and forested. The maintained or developed areas consist of landscaped grounds surrounding buildings and other maintained grounds, such as recreational fields and large expanses of lawns. Forest habitat is very

limited on the Main Post. Most of the forest habitat on the installation occurs on the southern portion of the Charles Wood Subpost. It consists of secondary hardwood growth with a closed canopy and moderate to dense undergrowth. Oak (*Quercus* sp.) and birch (*Betula* sp.) are dominant species. A vegetative community and flora planning level survey (PLS) of the upland forest habitats on the Charles Wood Subpost is planned for 2000, and will provide a more precise description of the habitat character and condition. Further discussion of the vegetative species in the upland habitats is provided in Section 3.16.

3.15 WETLANDS AND RIPARIAN HABITATS

Wetlands on the installation were delineated, mapped, and described in 1998 during a wetlands delineation project (Versar, 1998). Approximately 12.5 acres of wetlands occur on the Main Post, and 30 acres occur on the Charles Wood Subpost (Figures 3-1 and 3-2).

Most of the wetland areas located within the Main Post are associated with Parkers Creek, Oceanport Creek, and Husky Brook. Wetlands along Parkers Creek vary from a common reed (*Phragmites australis*)/narrow-leaved cattail (*Typha angustifolia*)/Japanese knotweed (*Polygonum cuspidatum*) association in the eastern and central sections to a narrow forested community in the western section where the creek becomes Lafetra Creek. The forested western section is dominated by green ash (*Fraxinus pennsylvanica*), red maple (*Acer rubrum*), and pin oak (*Quercus alba*); the shrub layer contains silky dogwood (*Cornus amomum*), southern arrowwood (*Virburnum dentatum*), and multiflora rose (*Rosa multiflora*); and the herbaceous layer is predominantly reed canary grass (*Phalaris arundinacea*) (Versar, 1998).

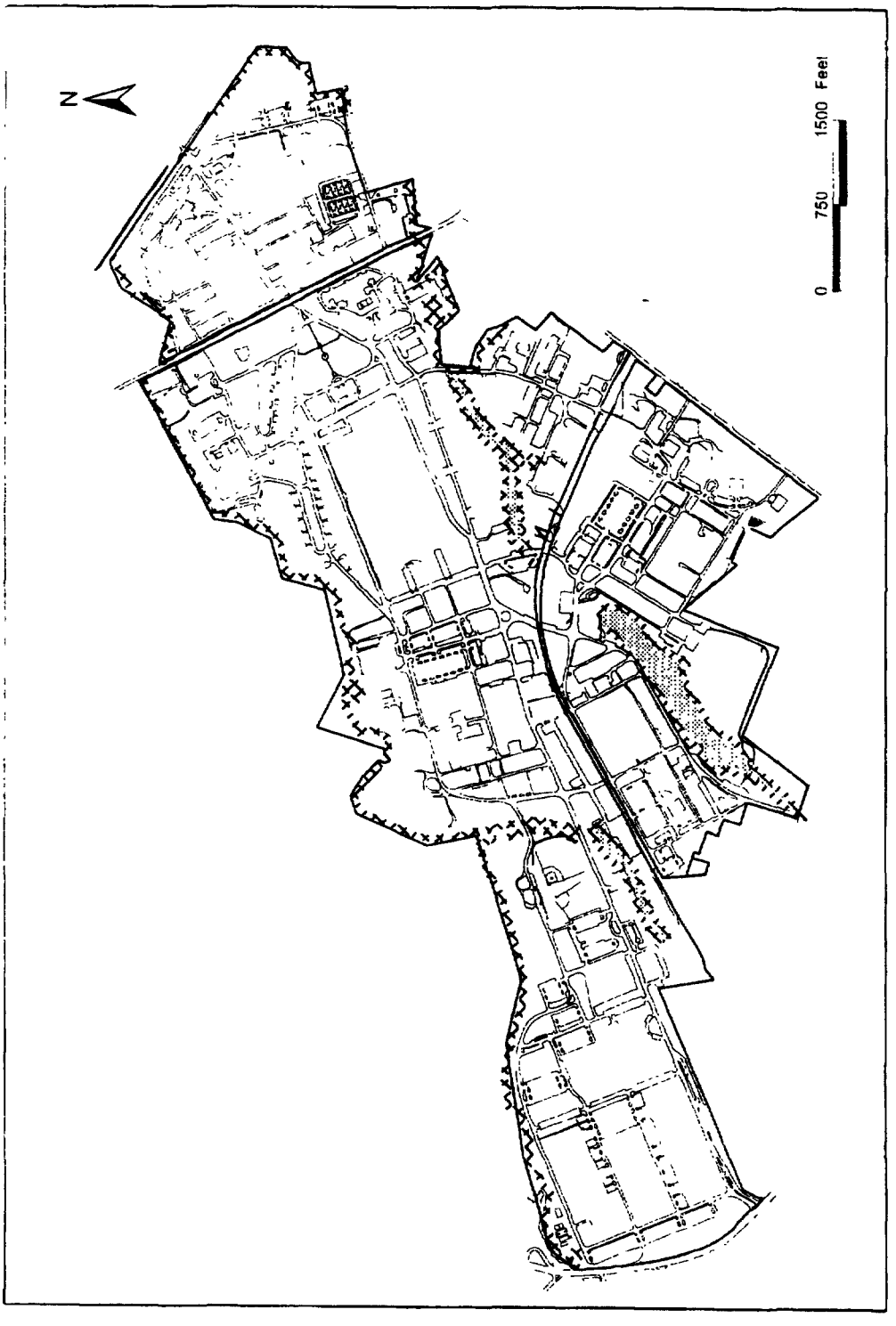
Mill Brook, which splits from Parkers Creek at Lafetra Creek, is highly channelized and has only a narrow margin of herbaceous wetland on each bank in the northern section. These margins are dominated by reed canary grass and stinkweed (*Pluchea camphorata*). South of the Avenue of Memories, Mill Brook has a shrub/scrub community dominated by silky dogwood and southern arrowwood in the shrub layer. Japanese knotweed in the herbaceous layer, and small red maple and sweet gum (*Juglans nigra*) in the tree layer (Versar, 1998).

Near the western end of Husky Brook Lake is an alder (*Alnus* sp.) thicket, dominated by speckled alder (*Alnus rugosa*) and black willow (*Salix nigra*). The shrub layer is dominated by silky dogwood and the herbaceous layer is dominated by jewelweed (*Impatiens duthicae*). The rest of the perimeter of the lake has a very narrow shrubby community dominated by silky dogwood and speckled alder (Versar, 1998).

Wetlands along Oceanport Creek are generally herbaceous and are dominated by saltwater cordgrass (*Spartina alterniflora*) and common reed. The only shrubs present are groundsel bush (*Baccharis halimifolia*) and high tide bush (*Iva frutescens*). There are few trees along the tidal wetlands. The westernmost section of Oceanport Creek (west of Murphy Drive) is highly channelized, with only a narrow fringe of herbaceous wetlands dominated by common reed and grass-leaved goldenrod (*Euthamia graminifolia*) (Versar, 1998).

Several reaches of Husky Brook, Wampum Brook, Lafetra Creek, and Parkers Creek on the Main Post are significantly eroded, due to instream scouring and the natural twice-daily tidal fluctuation in water level (ATC Associates, 1999).

The forested wetland portion of the Charles Wood Subpost bordering the railroad tracks is dominated by red maple and sour gum (*Nyssa sylvatica*), with a shrub layer of swamp azalea (*Rhododendron viscosum*), sweet pepperbush (*Clethra alnifolia*), and southern arrowwood and an herbaceous layer of Canada mayflower (*Maianthemum canadense*), cinnamon fern (*Osmunda cinnamomea*), and sensitive fern (*Onoclea sensibilis*) (Versar, 1998). Other wetlands on the Charles Wood Subpost are found along Mill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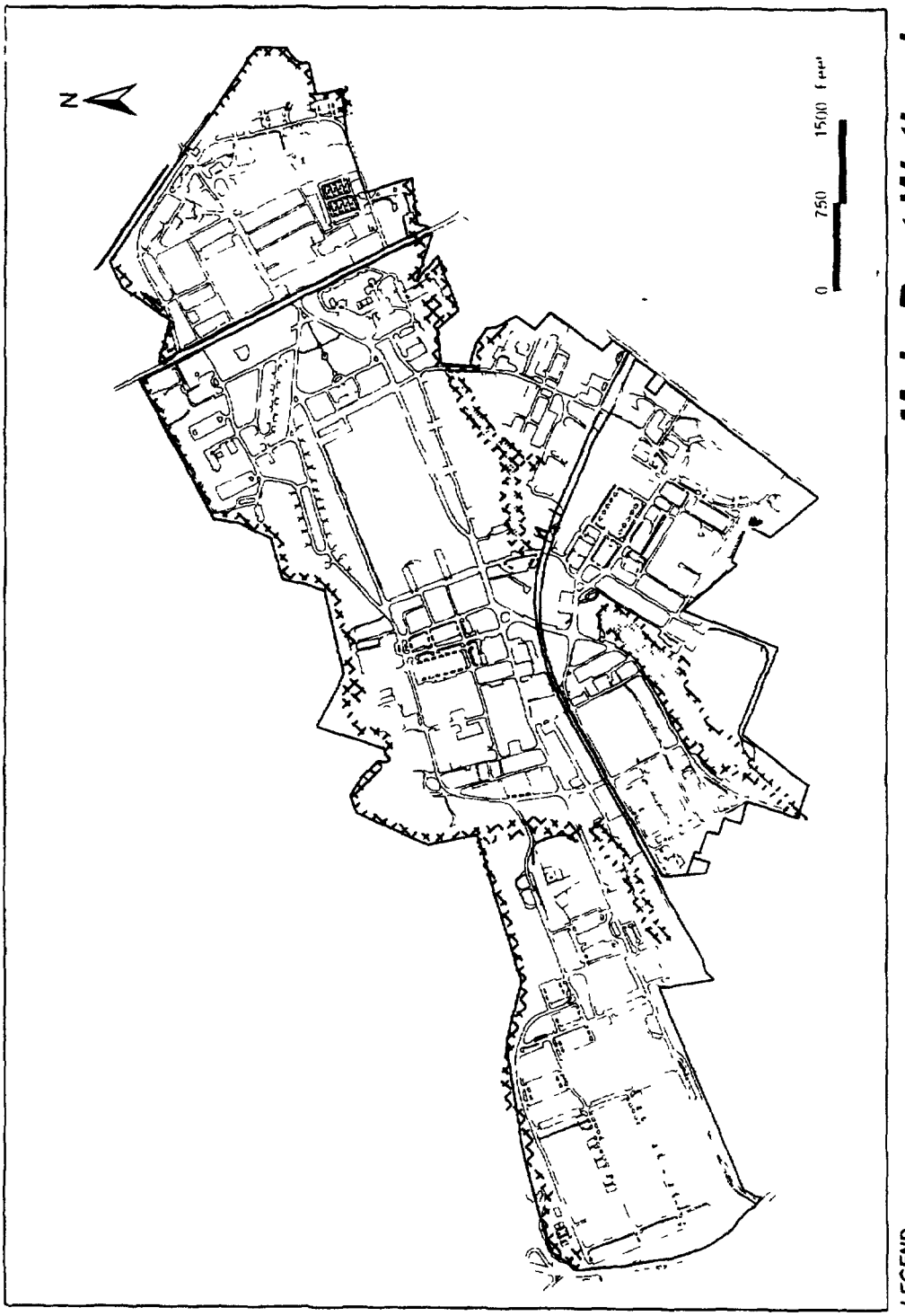
Main Post Wetlands
LEGEND
Wetland
50 Foot Wetland Setback
Installation Boundary
Road
Source: Fort Monmouth, 1999

Figure 3-1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0
750
1500 Feet
Main Post Wetlands
LEGEND
Wetland
50 Foot Wetland Setback
Installation Boundary
Road
Source: Fort Monmouth 1999

Figure 3-1

Brook, which flows through the entire length of the golf course and then under Hope Road into the western section of the subpost. On the golf course the wetlands are herbaceous and narrow, predominated by jewelweed, arrow-leaved tearthumb (*Polygonum sagittatum*), halberd-leaved tearthumb (*Polygonum arifolium*), and reed canary grass. West of Hope Road the brook is channelized in places and mowed to the edge in others, with narrow riparian vegetation. Principal species are arrow-leaved tearthumb, red-rooted sedge (*Cyperus erythrorhizos*), and American bur-reed (*Sparganium americanum*). The westernmost section of Mill Brook, after Corregidor Road, has a tree layer dominated by sweet gum, a shrub layer dominated by common elderberry (*Sambucus canadensis*) and multiflora rose, and an herbaceous layer dominated by jewelweed, fox grape (*Vitis labrusca*), and meadow horsetail (*Equisetum pratense*).

3.16 FLORA

Natural areas in Fort Monmouth are vegetated with oak, pine (*Pinus* spp.), honey locust (*Gleditsia triacanthos*), black locust (*Robinia pseudoacacia*), huckleberries (*Gaylussacia* spp.), and ferns in the genus *Aythrium*. Reeds, sedges, and marsh grasses are common along the banks of Oceanport Creek and Parkers Creek on the Main Post. The forested area in the southwestern portion of the Charles Wood Subpost has significant numbers of white birch (*Betula papyrifera*) and American holly (*Ilex opaca*). Many other species of trees and shrubs occur in lesser quantities on the installation. Trees are planted on the installation in accordance with the *Fort Monmouth Installation Design Guide* (Black and Veatch, 1991). A vegetative community and flora PLS will be conducted on the unsurveyed natural areas of the installation in FY 2000.

A variety of grasses and wildflowers are also present in upland sites on the installation. Most of the vegetation on the Main Post and the Charles Wood Subpost consists of a maintained system of turf managed at different intensities, designed landscapes, and urban forest.

Lawns, ball fields, parade grounds, and roadside areas in the Main Post are planted in grass mixtures that may include Kentucky bluegrass (*Poa pratensis*), Merion bluegrass (*Poa* sp.), Chewings fescue (*Festuca* sp.), and perennial ryegrass (*Lolium perenne*) (Black and Veatch, 1991)

There are no timber harvesting activities at Fort Monmouth.

3.17 FAUNA

Most of Fort Monmouth consists of developed areas with open lawns and scattered ornamental trees and shrubs that provide little habitat for wildlife. Vegetative buffer areas along the creeks in Fort Monmouth provide food and cover for species that commonly occur in Monmouth County (HQDA, 1994). A fauna PLS will be conducted on the installation in 2000 to improve the characterization of the fauna and their management.

3.17.1 Mammals

Mammal species commonly seen at Fort Monmouth are the woodchuck *(Mannota monax)*, eastern cottontail rabbit *(Sylvilagus floridanus)*, and eastern gray squirrel *(Sciurus carolinensis)*. Other mammals common to the area and likely to occur on the installation include the raccoon *(Procyon lotor)*, striped skunk *(Mephitis mephitis)*, eastern chipmunk *(Tamias striatus)*, muskrat *(Ondatra zibethica)*, and Norway rat *(Rattus norvegicus)* (Harland Bartholomew & Associates, 1984).

3.17.2 Birds

The installation provides habitat for a variety of avian neotropical species, including songbirds, wading birds, and shorebirds. Bird species that commonly occur in Monmouth County include the Canada goose, herring gull (*Larus argentatus*), mallard (*Anas platyrhynchos*), blue jay (*Cyanocitta cristata*), European starling (*Sturnus vulgaris*), American robin (*Turdus migratorius*), Carolina chickadee (*Parus carolinensis*), tufted titmouse (*Parus bicolor*), northern mockingbird (*Mimus polyglottos*), house sparrow (*Passer domesticus*), red-winged blackbird (*Agelaius phoeniceus*), northern cardinal (*Cardinalis cardinalis*), house finch (*Carpodacus mexicanus*), and song sparrow (*Melospiza melodia*) (USACE, 1993). These species are also expected to occur at Fort Monmouth.

3.17.3 Amphibians and Reptiles

Locally occurring amphibians likely to occur at Fort Monmouth include the red back salamander (*Plethodon cinereus*), spring peeper (*Hyla crucifer*), wood frog (*Rana sylvatica*), bullfrog (*Rana catesbeiana*), and green frog (*Rana clamitans*). Commonly occurring reptiles likely to occur at Fort Monmouth include the common snapping turtle (*Chelydra serpentina*), northern brown snake (*Storeria dekayi*), northern water snake (*Nerodia sipedon*), and eastern garter snake (*Thamnophis sirtalis*) (USACE, 1993).

3.17.4 Fish

Parkers Creek and Oceanport Creek are brackish, tidally influenced creeks located on the northern and southern boundaries, respectively, on the Main Post. Fish known to occur in these creeks include menhaden (*Brevooritia tyrannus*), blueback herring (*Alosa aestivales*), and alewife (*Alosa pseudoherengus*).

Freshwater creeks on the Main Post include Mill Brook, Lafetra Creek, and Husky Brook. Fish species that might occur in these creeks include white perch (*Morone americana*), carp (*Cyprinus carpio*), catfish (*Ictalurus* spp.), sunfish (*Lepomis* spp.), and crappie (*Pomoxis* spp.) (USACE, 1993). Husky Brook Lake is stocked with approximately 1,000 rainbow trout (*Oncorhynchus mykiss*) and brook trout (*Salvelinus fontinalis*) each year in March and May for a put-and-take fishery. The fish are about 10 to 12 inches in length. The trout do not survive beyond August of each year because the increase in water temperature causes depletion of available oxygen. Largemouth bass (*Micropterus salmoides*) have also been introduced to Husky Brook Lake in an attempt to create a recreational bass fishery. The bass did not proliferate as expected, and Fort Monmouth personnel are experimenting with artificial spawning beds to help develop the recreational fishery (USACE, 1993).

Wampum Brook and Mill Brook on the Charles Wood Subpost might contain sunfish and other small species.

3.18 PRESERVES, SPECIAL HABITATS, AND SIGNIFICANT NATURAL AREAS

There are no preserves, officially designated critical habitats, or special habitats for endangered, threatened, or rare species on the installation. The *Analytical/Environmental Assessment Report on Plans for Future Development* (Harland Bartholomew & Associates, 1987) describes the areas adjacent to streams as environmentally sensitive, and these areas on Fort Monmouth are discussed in Section 3.15. These areas are designated in the land use plan as such and are recommended to be left in a natural state. The natural areas on the installation are generally small and surrounded by urban and suburban land uses.

3.19 ENDANGERED, THREATENED, AND RARE SPECIES

Other than the occasional transient peregrine falcon (*Falco peregrinus*), no federally listed or proposed threatened or endangered flora or fauna are known to occur at Fort Monmouth. USFWS has indicated that no federally listed or proposed endangered or threatened fauna or flora under USFWS jurisdiction are known to exist on the Main Post. A vegetation survey and wetland delineation conducted at the Charles Wood Subpost found no endangered, threatened, or rare species or any evidence to suggest that such species might inhabit the site (NJDEP, 1995, cited in USACE, 1995b). Suitable habitat for swamp pink (*Helonias bullata*) might exist on the Main Post, but the species was not encountered on the installation during a wetland delineation study conducted in August 1998 (Versar, 1998). The swamp pink is federally listed as a threatened plant species. Correspondence from USFWS and the state of New Jersey's Natural Heritage Program regarding the occurrence of endangered, threatened, and rare species in the vicinity of Fort Monmouth is contained in Appendices A and B, respectively. USFWS has requested the results of any assessments of habitat suitability or surveys conducted for swamp pink at the Main Post.

Appendix B also provides a listing of rare species that have been recorded in Monmouth County. It is unlikely that habitats suitable for these species occur on Fort Monmouth.

3.20 CULTURAL RESOURCES

Cultural resources at Fort Monmouth include both historic buildings and archeological sites. The inventory of historic buildings is 99 percent complete. Of the approximately 670 buildings and structures on the Main Post and on the Charles Wood Subpost, most do not meet the minimum criteria for National Register of Historic Places (NRHP) eligibility and do not warrant assessment. A total of 343 buildings and structures that meet the minimum criteria have been assessed. Of these, 98 are eligible for inclusion to the NRHP. Most of these buildings are residential. Ninety-three of the 98 eligible buildings are physically located within two districts. A historic district on the Main Post contains 88 of the eligible properties, and a smaller historic district in the Charles Wood Subpost contains 5 eligible properties. An additional five eligible buildings are not located within either district. Finally, two buildings require secret clearance for access and have not yet been inventoried or assessed.

The archeological inventory is about 3 percent complete. No sites were found in this 3-percent sample; however, nine archeological sites have been recorded by other menas. In addition, 204 potential site locations acress the entire post are suspected but have not been investigated. None of these archeological sites have been evaluated for NRHP eligibility. The uninventoried portions of the Main Post and the Charles Wood Subpost have been classified into three zones of archeological potential. Some 446 acres have "high" potential for archeological sites, 156 acres have "medium" potential, and 602 acres have "low" potential.

3.21 SOCIOECONOMIC RESOURCES

3.21.1 Demographics

Most of the Fort Monmouth workforce living off post resides in Middlesex, Monmouth, and Ocean counties, which were the three fastest-growing counties in New Jersey between 1980 and 1990. At the time of the 1990 census, the total combined population in the three counties was more than 1.65 million persons (Middlesex County, 671,780; Monmouth County, 553,124; Ocean County, 433,203), compared to the total 1990 population of 7.7 million for the entire state of New Jersey (New Jersey Department of Labor, 1990). The state population is projected to be 8.1 million in 2000 (Middlesex County Planning Department, 1994). The population density in the counties surrounding the installation averages 777

persons per square mile, which is typical of New Jersey, the most densely populated state in the nation (Monmouth County Planning Board, 1995; USACERL, 1994).

The workforce population at Fort Monmouth currently is approximately 9,700 persons and is composed of approximately 800 military personnel and 8,900 civilians. In addition, approximately 1,500 dependents live on the Main Post or the Charles Wood Subpost in family housing, bringing the total combined installation population to approximately 11 000. Approximately 23,000 retired military personnel also live in the vicinity of Fort Monmouth (Kenzik, 1995).

3.21.2 Regional Economic Activity

The 1990 unemployment rate for the United States averaged 5.5 percent, and the rate for the state of New Jersey averaged 3 percent (Grolier, 1995). The Middlesex County unemployment rate was 4.4 percent in 1990 (Middlesex County Planning Department, 1994). The Monmouth County unemployment rate was 4 percent in 1990 (Monmouth County Economic Development, 1995). The unemployment rate for Ocean County was 4.2 percent in 1990 (Ocean County Planning Board, 1995).

3.21.3 Visual and Aesthetic Values

The Main Post is visible to the surrounding community. Although the Main Post is bounded by Parkers Creek to the north, there is extensive residential development to the south. There is scattered vegetation to provide some visual screening, but in general views of the post are open.

The *Fort Monmouth Installation Design Guide* (Black and Veatch, 1991) defines visual zones, provides design themes for each zone, and provides design criteria for new projects. Personnel responsible for the design of new facilities are responsible for ensuring that each project meets the design criteria. Implementation of the design criteria ensures that new facilities are in harmony with established design themes and maintains the overall image of Fort Monmouth.

According to the *Fort Monmouth Installation Design Guide*, five visual zones have been identified for Fort Monmouth: administrative/mission support, community support facilities, housing, industrial facilities, and open spaces. These zones have been defined on the basis of land use and type of activity. Architectural styles in these zones include colonial, traditional, modified traditional, and high-technology (HQDA, 1994).

3.21.4 Recreation

Fort Monmouth offers a number of recreational facilities, such as a community center, a library, a bowling alley, several youth centers, Boy Scout and Girl Scout buildings, several physical fitness centers, approximately 10 ball fields, several picnic areas with one picnic shelter, and an arts and crafts center. Other community facilities include a commissary, a Post Exchange, and an officers' club. Recreational, medical, commissary, and other community facilities on the post are used by nearby retired military personnel as well as by active duty personnel (HQDA, 1994).

Outdoor recreational areas are chiefly the golf course, sports fields, and picnic grounds, but the land has potential to support some natural resources-based recreation. For example, Husky Brook Lake could be improved for fishing. Wetland and terrestrial habitats could be enhanced for nongame species to provide nonconsumptive activities such as birding, wildlife watching, and outdoor photography.

3.22 ENVIRONMENTAL JUSTICE

On 11 February 1994 President Clinton issued Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations." The purpose of the order is to avoid the disproportionate placement of any adverse environmental or economic impacts from federal policies and actions on minority and low-income populations (HQDA, 1994).

As identified by the 1990 census, approximately 87 percent of the population in the three counties surrounding the installation was Caucasian, 7 percent was African American, 4 percent was Asian or Pacific Islander, and 2 percent was other. Less than 1 percent was American Indian, Eskimo, or Aleutian. Approximately 6 percent of the surrounding population was of Hispanic origin[1] (USACERL, 1994).

In the state of New Jersey in 1990, approximately 7.5 percent of the population had an income below the poverty level. Approximately 5 percent of the population of Monmouth County fell below the poverty level (Monmouth County Planning Department, 1990).

[1] Persons of Hispanic origin may be of any race

SECTION 4.0: MANAGEMENT PROGRAMS AND INITIATIVES

4.1 NATURAL RESOURCES MANAGEMENT

4.1.1 Fish and Wildlife Management

Fish and wildlife management has not been a major goal of Fort Monmouth. The military mission does not depend on the natural resources of the base, and the small size of the installation limits available habitat for fish and wildlife. No areas on the installation are set aside for hunting activities, nor are there any special wildlife management activities for game species. However, habitat does exist or could be improved to support a variety of nongame species and nonconsumptive uses, as well as to enhance the quality of living for installation residents and personnel.

4.1.2 Forest Management

Fort Monmouth does not produce timber on a sustained basis, and commercial forestry is not feasible because of the small amount of forested land on the installation. Most trees and shrubs on the grounds serve as landscape features and are maintained according to the guidelines provided by the Fort Monmouth IDG (Black and Veatch, 1991).

4.1.3 Inventory and Monitoring

Inventory can include a variety of survey techniques used to determine the kinds or numbers of animals, plants, and other natural resources (e.g., soil types) present on an area. Inventories are used to collect baseline data and may involve various levels of complexity, ranging from surveys to ascertain the presence or absence of species to intense censuses used to determine population density and structure. Monitoring is the follow-up process that serves as a means to check the results of management and thereby provide future direction. Monitoring activities are as diverse as monthly testing of environmental components, such as water or soils, and conducting a periodic census to determine population trends. Regardless of the levels of intensity involved, inventory and monitoring are essential elements for the successful management of natural resources.

Faunal Inventory and Monitoring. Faunal surveys have not been conducted on Fort Monmouth. Mammals and birds encountered during a 1998 delineation of wetlands were recorded, providing information about the species and variety of wildlife present on the installation. A formal planning-level fauna survey will be conducted in FY 2000.

Floral Inventory and Monitoring. Wetland flora has been surveyed and described in wetland delineation work conducted at Fort Monmouth (Versar, 1998). Wetlands account for the majority of natural areas on the installation. The upland forested areas of the Charles Wood Subpost have not been systematically surveyed, and a planning-level vegetative community and flora survey is planned for FY 2000.

Water Quality Monitoring. The Fort Monmouth Laboratory monitors the water quality in Husky Brook Lake and the quality of potable water sources for the installation on a monthly basis.

4.1.4 Stream Bank Stabilization and Erosion Control

A number of reaches (linear portions) of Husky Brook, Wampum Brook, Lafetra Creek, and Parkers Creek on the Main Post are significantly eroded. The primary type of erosion is bank undercutting, which results from scour due to instream flow. Gully erosion, due to overbank runoff, is a problem at one

location along Husky Brook, and a number of storm sewer outfall culverts along several stream reaches are also significantly eroded (ATC Associates, 1999). Fort Monmouth DPW has a draft plan for stream bank stabilization and erosion control for portions of the banks of Parkers Creek, Lafetra Creek, Wampum Brook, and Husky Brook adjacent to several solid waste landfills on the Main Post. The goals of the work plan are to repair erosion of stream banks and to minimize future erosion and resulting encroachment into the margin areas separating the landfills from the stream banks. While wildlife and fisheries enhancement are not goals of the project, they will result incidentally from the project, thus minimizing mitigation needs. The work plan is intended to compliment closure plans for the landfills adjacent to the streams and to compliment the remedial action work plans for the landfills themselves.

The locations and lengths of the proposed stream bank stabilization projects are:

- Approximately 1,600 feet of the north and south banks of Husky Brook between Murphy Drive and building 551 and an approximately 300 ft tributary.
- Approximately 1,500 feet of the south bank of Wampum Brook between buildings 1150 and 1123.
- Approximately 450 feet of the east bank of Wampum Brook between Avenue of Memories and North Drive.
- Approximately 400 feet of the east bank of Wampum Brook between North Drive and the confluence with Lafetra Creek.
- Approximately 1,900 feet of the south bank of Lafetra Creek between building 1213 and the confluence with Wampum Brook.
- Approximately 3,000 feet of the south bank of Parkers Creek between the confluence of Lafetra Creek and Wampum Brook and the large tidal marsh that is north of building 293.

Design constraints for stream bank stabilization measures include stream bank vegetation type, tidal or nontidal nature of the streams, and salinity of the stream waters. Other design constraints include limited historical streambed geomorphological data, separation of streams from their floodplains, and the need to avoid or at least minimize bank pull back. The types of streambank stabilization measures that can be employed are influenced by several factors, including stream channel geometry, streambank slope, stream water salinity, and existing streambank vegetation.

In open, non-wooded areas, standard bioengineering methods are recommended for stream bank stabilization to stop stream bank undercutting. On the Main Post, these areas include

- Wampum Brook between North Drive and Lafetra Creek
- The lower reach of Husky Brook

Other areas of undercutting occur in wooded areas where there is too much shade for some standard bioengineering methods to be effective. These areas include

- The upper wooded reaches of Wampum Brook
- The upper wooded reaches of Husky Brook
- Most parts of the south bank of Lafetra Creek
- Most undercut banks along Parkers Creek

Creative combinations of conventional armoring engineering and German- and Alpine-style bioengineering methods are recommended in these areas (ATC Associates, 1999). Removal of existing trees and shrubs in order to facilitate bioengineering methods is not a desirable option, though it may need to be considered in some locations. In some heavily wooded and shady areas, hand-placement of riprap

and/or biologs at selected undercuts will be preferable to tree and shrub removal. In a number of areas, no action would be preferable to removal of existing trees and shrubs.

4.2 ENDANGERED, THREATENED, AND RARE SPECIES MANAGEMENT

Coordination with USFWS (letter dated 27 August 1999), information obtained from the New Jersey Natural Heritage Program database (letter dated 25 June 1999), and conversations with installation personnel indicate that no federally endangered or threatened animal or plant species are known to exist on the installation. Copies of the referenced letters are included in Appendices A and B, respectively. The New Jersey Natural Heritage database reports seven federally listed species within Monmouth County, New Jersey: the endangered piping plover; the threatened northern bog turtle (*Clemmys muhlenbergii*); the endangered least tern (*Sterna antillarum*); the threatened northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*); the threatened sea-beach pigweed (*Amaranthus pumilus*); the threatened swamp pink (*Helonias bullata*); and the threatened Knieskern's beaked rush (*Rhynchospora knieskernii*). Based on available information, the only species for which suitable habitat might occur at Fort Monmouth is the swamp pink. A 1998 report of wetland delineation on the installation (Versar, 1998), however, specifically states that the swamp pink was not encountered during the field work. In a letter dated 23 December 1997 USFWS requested the results of an assessment of habitat suitability or of any surveys conducted for swamp pink at the Main Post of Fort Monmouth (see Appendix A). To date, USFWS has not received this information. PLSs will be conducted in FY 2000 to verify the presence or absence of habitat suitable for the swamp pink and the northern bog turtle. The results of the 1998 wetland delineation and of these PLSs will be forwarded to USFWS, as requested.

4.3 PEST MANAGEMENT

A Pest Management Plan has been prepared for the installation and is used to guide all pest management activities on Fort Monmouth. The plan incorporates the philosophy and practices of Integrated Pest Management, decreasing the reliance on chemical means of pest control and increasing the use of mechanical control methods and behavior modification to address pest control issues. The Pest Management Program at Fort Monmouth is implemented by DPW's Environmental Office.

Two potentially nuisance wildlife species on the installation grounds are the Canada goose and the woodchuck. The geese are of particular concern because several pair nest and raise their young at the installation. A large population of geese could create traffic hazards, conflicts with human activities, and intolerable amounts of droppings in public use areas and in Husky Brook Lake, where water quality is already poor.

An invasive species with minor occurrence on the installation is purple loosestrife *(Lythrum salicaria)*. In accordance with the Executive Order on Invasive Species, dated 3 February 1999, Fort Monmouth will identify any installation activities that could affect the status of invasive species on the installation, prevent the introduction of invasive species to the installation, control invasive species it identifies on the installation, and provide for the restoration of native species and habitat conditions in areas where invasive species occur on the installation.

4.4 LAND MANAGEMENT AND GROUNDS MAINTENANCE

Routine land management and grounds maintenance activities include lawn mowing once per week, application of lime and fertilizers on athletic fields (totaling 7 acres), and installation of new plant materials.

4.5 NATIONAL ENVIRONMENTAL POLICY ACT PROGRAM

The NEPA program at Fort Monmouth is implemented by DPW's Environmental Office. Personnel in the office are trained in NEPA program implementation at the installation, and when assistance is needed, support is available from AMC, USAEC, USACHPPM, and USACE. All NEPA procedures, including analyses of the environmental effects of potential actions at the installation and public, state, and federal reviews of such analyses, are complied with according to the requirements of federal law and Army regulations.

4.6 ENFORCEMENT

No natural resources law enforcement program is operative on Fort Monmouth at present. Installation military law officers enforce the laws pertaining to natural resources.

4.7 CULTURAL RESOURCES PROTECTION

A Cultural Resources Management Plan (CRMP) for Fort Monmouth has been prepared in compliance with AR 200-4. It is a 5-year plan for the integrated management of cultural resources at the installation. The CRMP does the following:

- Reviews the prehistory and history of Fort Monmouth and its region and develops a series of historical contexts with which to evaluate the NRHP eligibility of cultural resources at Fort Monmouth.
- Identifies management practices needed to enable compliance with cultural resources law.
- Delineates eight standard operating procedures (SOPs) that will help ensure compliance with laws.
- Develops a 5-year plan for FY 1996 through 2001.

The NHPA requires the Army to consider the effect of its actions on cultural resources that are eligible for inclusion on the NRHP. The SOPs and 5-year plan contained within the CRMP, as well as scheduled updates to the plan, adequately ensure compliance with the NHPA and Army regulations.

4.8 ECOSYSTEM MANAGEMENT

This INRMP follows the direction set forth in the memorandum issued by the Deputy Under Secretary of Defense for Environmental Security (8 August 1994) regarding *Implementation of Ecosystem Management in the DoD.* The memorandum states that ecosystem management will become the basis for future management of DoD lands and waters. In this context, ecosystem management will include the following:

- *Ecological approach:* There will be a shift from the management of individual species to the management of ecosystems.
- *Partnerships:* Ecosystems cross political boundaries, making the need for cooperation, coordination, and partnerships essential for managing ecosystems.
- *Participation:* Public needs and desires will be emphasized in management decisions.
- *Information:* The best available scientific information will be used to select technologies to be used in managing natural resources.
- *Adaptive management:* Adaptive management techniques will be incrementally applied as they are identified.

DoD's overall goal regarding ecosystem management is ". . . to preserve, improve, and enhance ecosystem integrity. Over the long term, this approach will maintain and improve the sustainability and biological diversity of terrestrial and aquatic (including marine) ecosystems while supporting sustainable economies and communities." The specific principles and guidelines DoD has identified to achieve this goal, listed below, are reflected in the management measures set forth in Section 5.0 of this plan:

- Maintain and improve the sustainability and native biodiversity of ecosystems.
- Administer with consideration of ecological units and time frames.
- Support sustainable human activities.
- Develop a vision of ecosystem health.
- Develop priorities and reconcile conflicts.
- Develop coordinated approaches to work toward ecosystem health.
- Rely on the best science and data available.
- Use benchmarks to monitor and evaluate outcomes.
- Use adaptive management.
- Implement through installation plans and programs.

Ecosystem management recognizes that humans are ecosystem components and that sustainable human activity does not mutually exclude the preservation and enhancement of ecological integrity. Therefore, it is ecosystem management that provides Fort Monmouth the means to both protect biodiversity and continue to provide high-quality military readiness.

The management measures and strategies that will be implemented at Fort Monmouth have been developed with consideration for the interrelationships between the individual components of the ecosystem, the requirements of the military mission, and other land use activities. The focus is on maintaining the structure, diversity, and integrity of the biological communities while recognizing that installation personnel and the military mission are vital components of the ecosystem. An adaptive management strategy has been incorporated into this INRMP to monitor the temporal and spatial dynamics of the ecosystems and to adjust the management measures and strategies based on improved knowledge and data. The monitoring programs generate the data needed to determine whether the management measures and strategies are effective in achieving their intended goals and objectives. This management approach will preserve and enhance the natural resources while providing the optimum environmental conditions required to sustain the military mission.

SECTION 5.0: NATURAL RESOURCES MANAGEMENT

This section begins with an overview of the general goals and objectives established by DPW at Fort Monmouth for the management of natural resources. Section 5.2 provides a description of the methods used to develop this INRMP and the management measures for each resource area. Resource-specific discussions, provided in Sections 5.3 through 5.7, provide detailed explanations of the goals and objectives, management strategies, and other management alternatives considered for each resource area. Resource-specific goals and objectives are provided, as well as the relationship of the resource to supporting the mission. The subsections entitled "Management Measures" describe the management measures selected to be implemented to meet the resource-specific goals and objectives. These subsections also provide the rationale for why the management measures were selected and their potential relationship to or impact on other natural and cultural resources and the military mission. Other management alternatives considered but rejected for reasons such as economical or ecological impracticality are discussed under an additional subheading under each resource area. Section 5.8 summarizes the management measures, including inventorying and monitoring programs, for all resource areas, their relationships to each other and the military mission, and how they serve to achieve the goals and objectives of the natural resources management program at Fort Monmouth.

5.1 GOALS AND OBJECTIVES OF THE NATURAL RESOURCES MANAGEMENT PROGRAM

The goal established by Fort Monmouth for the natural resources management plan is to protect and maintain the natural resources of the installation, to improve degraded habitats, and to manage the grounds of the installation in a manner that supports and benefits the local ecology and sustains the military mission.

DPW has identified a number of objectives necessary to achieve this goal:

- Conduct a natural resources management program that reflects the principles of ecosystem management.
- Use adaptive management techniques to provide the flexibility to adapt management strategies based on increased knowledge gained from monitoring programs and scientific literature.
- Protect forest resources from unacceptable damage and degradation resulting from insects and disease, animal damage, invasive species, and wildfire; manage the resources in a manner that supports the military mission.
- Protect the fish and wildlife species and the habitats on the Main Post and the Charles Wood Subpost to maintain or increase the abundance and biodiversity of native species.
- Protect and aid in the recovery of endangered and threatened species and other special-interest flora and fauna species and their supporting habitats in compliance with the ESA, Sikes Act, and Army natural resource guidance.
- Protect, to the extent practical without undue restrictions on operations, rare and unique species that do not have legal protection status but have been identified as having special significance either locally or within the state.
- Control nuisance and invasive species that hinder conduct of the military mission or jeopardize the welfare of installation residents and personnel.
- Protect and preserve cultural resources in accordance with state and federal laws.
- Provide outdoor recreational opportunities that avoid conflict with the military mission.
- Provide a positive contribution to the community by offering informative and educational instruction and opportunities.
- Protect soils from erosion.

5.2 METHODS

The preparation of this INRMP involved the review and analysis of past natural resource management activities, ongoing programs, and the current conditions of the existing resources as detailed in Section 3.0. The review process included interviewing Fort Monmouth personnel and persons from state and federal agencies (e.g., NJDFGW and USFWS), collecting existing environmental documentation, and conducting field reconnaissance of the installation.

The findings from the interviews, field reconnaissance, and document review process have been synthesized and incorporated into this INRMP using the ecosystem management approach described in Section 4.8. Where data gaps exist, inventorying and monitoring programs have been proposed. These programs are designed to collect the data necessary to fill those information gaps and to achieve the objectives of the natural resources program.

The approach used to develop the discussion of the management strategies for each resource followed three general steps:

- *Goals and objectives.* The goals and objectives for the management of the resource, as well as the relationship of the resource to other components of the ecosystem (including the human component) and to the military mission, were described.
- *Management measures.* Past management strategies and current conditions were evaluated, management strategies based on ecosystem management principles were considered, and those strategies that would best achieve the goals and objectives for natural resource management were selected. An inventory of needs and monitoring programs necessary to generate data to ensure continued success of the program and to provide the information needed to facilitate the integration of adaptive management techniques was included. Adaptive management is a continuing process of action(s) based on planning, monitoring, evaluation, and adjustment. When adequately designed and effectively implemented, the process allows managers to determine how well their actions are meeting their objectives and what management steps are needed to increase the chances of achieving the objectives.
- *Other management alternatives considered.* Other management alternatives were considered during the screening process but were eliminated because they were economically infeasible, ecologically unsound, or incompatible with the requirements of the military mission. A discussion of these alternatives is included in this INRMP.

5.3 HABITAT MANAGEMENT

Habitat management is the primary tool for managing healthy fish and wildlife populations, controlling nuisance and invasive species, and providing quality recreational opportunities for the Fort Monmouth community. The primary objective of habitat management on Fort Monmouth is to maintain natural habitats in a state that sustains natural biodiversity, maintains healthy populations of plants and animals, and supports the local ecology. Specific objectives associated with habitat management at the installation include the following:

- Identify and analyze data and information gaps with respect to effectively managing Fort Monmouth's natural resources on an ecosystem basis. Prioritize data- and information-gathering efforts.
- Identify opportunities for research and education activities related to fish and wildlife resources on Fort Monmouth.

Management measures related to specific habitat types (forest habitat, maintained grounds, and aquatic habitat) on the installation are discussed below.

5.3.1 Forest Habitat Management

Management Measures

Conduct a PLS of the non-wetland forested areas (FY 2000). A PLS of the vegetation of the upland forested areas on the installation (on the Charles Wood Subpost) will be performed in order to provide community- and species-level information about the forested areas (Figure 5-1). The survey will be performed in three phases—spring (April), early summer (June), and autumn (September)—in order to identify plants that flower at different times of the year. The PLS should provide the following information:

- Identification of the dominant and subdominant vegetation of the canopy, understory, and herbaceous layers.
- Characterization of the specific type of hardwood forest type this habitat represents.
- Identification of the age and ecological condition of the habitat.

The survey data and information will serve as a baseline for future monitoring and management efforts, and further management efforts will be determined based on the results of the community and vegetation PLS.

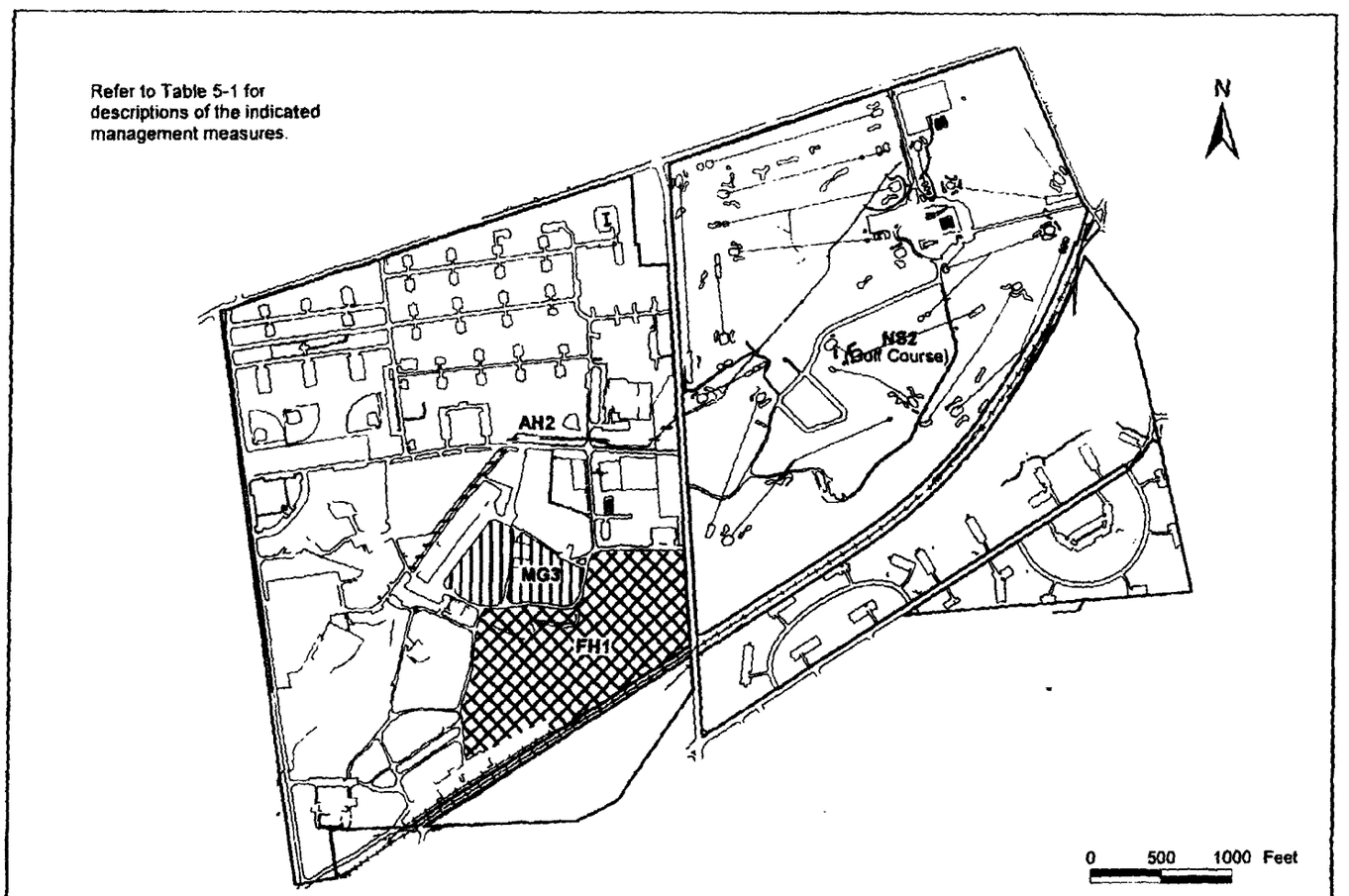
Avoid disturbances to forested habitats (FY 2000-2004). Where activities at Fort Monmouth could result in disturbance to existing forested areas, all reasonable options for locating such activities away from forested areas will be investigated. Habitat disturbances to be avoided include, but are not limited to:

- Physical habitat destruction: for example, damage from construction of new facilities.
- Disturbances to behavioral patterns of animals that occupy the forests; for example, excessive noise.
- Location of pollution sources; for example, an air emission source close to a forested area.

Leave dead and dying trees for cavity-nesting species (FY 2000-2004). Trees in the forested areas that pose no danger to installation operations and personnel, and that are not infected with diseases that could be spread to other trees, will be left in place to provide habitat for cavity-nesting species such as woodpeckers and owls. Modern economically focused forest management has reduced the availability of suitable trees for such species, and it is important that such habitat be provided where possible.

Encourage the use and enjoyment of forested areas on Fort Monmouth (FY 2000-2004). The installation community will be encouraged to use the forested areas for nonconsumptive and nondestructive recreation such as birdwatching and outdoor photography. Fort Monmouth recognizes that the natural areas on the installation will be better protected if they are used and valued by the local community. Examples of how the Fort Monmouth community might increase their enjoyment of the natural resources of the installation include the following:

- Occasional publication of nature-oriented articles in an installation newsletter.
- Slide presentations by local naturalists.
- Photography contests.
- Animal and plant identification walks through the forested areas led by knowledgeable Fort Monmouth personnel.



Charles Wood Subpost Key Projects

Figure 5-1

Periodically monitor forested areas (FY 2001-2004). Monitoring for signs of stress or invasive species will be done in conjunction with the NJDFGW and will occur more frequently when known stressors (such as diseases) or invasive species (usually destructive insects, but also invasive plant species) are reported as problems in the central New Jersey region. Periodic (e.g., annual) monitoring of the forest habitats should occur after the baseline information from the community and vegetative PLS is obtained. Monitoring might include surveys for signs of disease and infestation, habitat use by indicator species (e.g., bird nesting), plot analyses of dominance and subdominance (e.g., every 5 years in established, permanent plots), and hardwood growth.

Other Management Alternatives Considered

Increase the area of forested land at Fort Monmouth. Increasing the area of upland forested ground at the installation might be feasible because of the abundance of open, maintained ground on the installation that does not need to be maintained in its current state for accomplishment of the military mission. However, this management measure should be implemented only after the existing upland forested areas have been surveyed, their community types identified and mapped, and their current state of health assessed. Moreover, areas that would contribute most to the overall ecological health of the upland forested communities if they were converted from maintained grounds to upland forest should be identified before implementation of this management measure.

5.3.2 Maintained Grounds Management

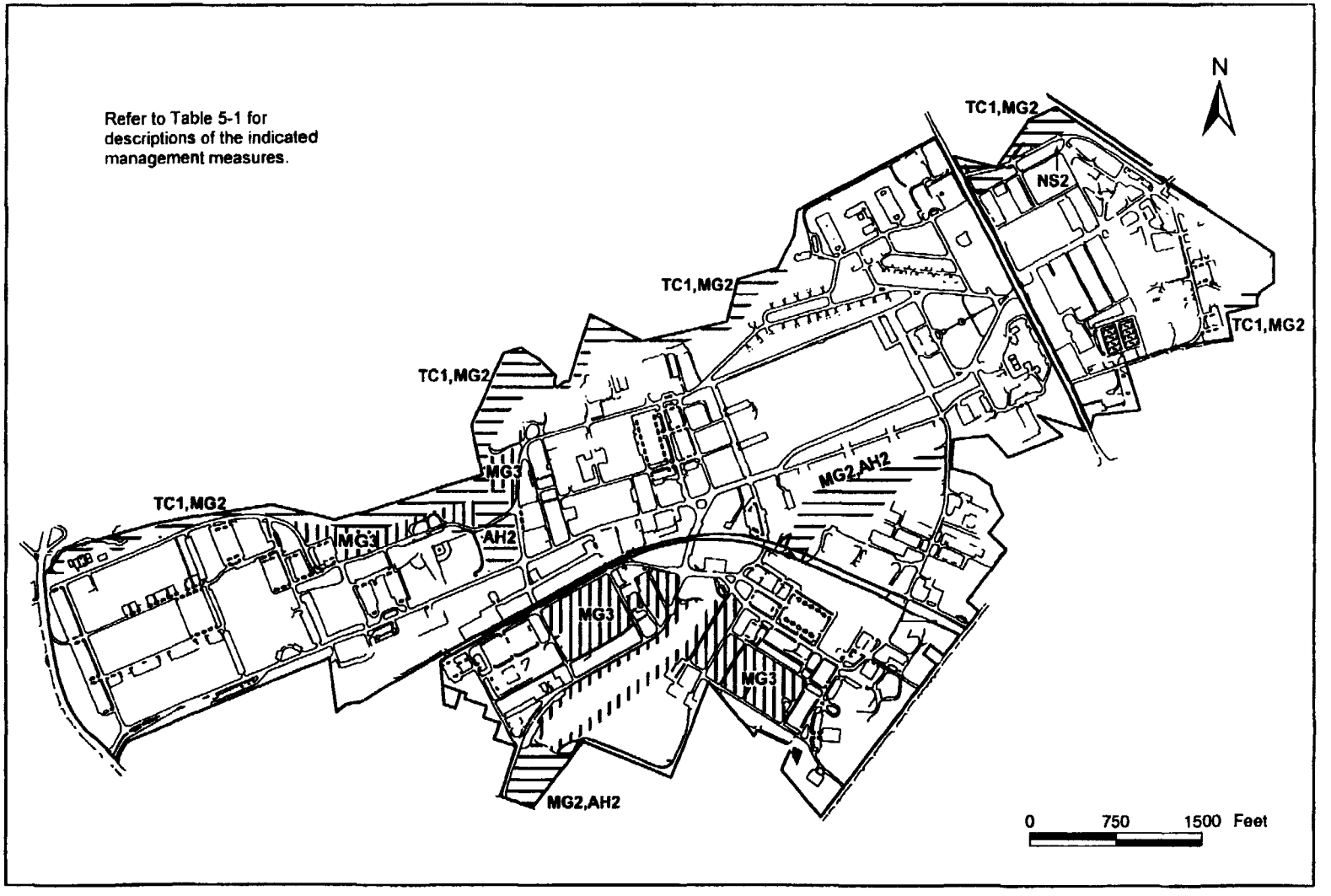
Management Measures

Implement erosion control measures (FY 2000-2004). Erosion and sediment control measures will be implemented where and when necessary on maintained grounds to control sediment loads into waterbodies, such that they do not violate NPDES permits or Section 401 water quality standards. Patches of bare ground created during maintenance activities and localized overuse of soils in recreational areas or along frequently walked paths are examples of means by which soils at the installation might become exposed and subject to erosion. Even small patches of bare soil near waterbodies can contribute significant quantities of sediment to streams and ponds. Vegetative erosion control methods (e.g., planting grass) are preferred.

Convert maintained grounds to natural vegetation (FY 2001-2004). Where feasible near existing forested areas and streams, maintained grounds will be converted to natural vegetation to reduce the grounds maintenance burden, provide additional areas for nonconsumptive recreational activities, and improve and expand wildlife habitat (Figure 5-2). Grounds maintenance is a financial burden at Fort Monmouth, and numerous areas on the installation are maintained as landscaped areas primarily because they have historically been managed as such. However, the current military mission no longer requires that these areas be maintained as landscaped grounds. Natural vegetation could be planted to encourage the establishment of buffer zones surrounding upland forested and wetland areas. Candidate locations for conversion from maintained grounds to natural vegetation include the following:

- Upland areas bordering Parkers Creek, Lafetra Branch, and Oceanport Creek on the Main Post (FY 2001).
- Upland areas bordering Husky Brook, downstream from Oceanport Creek (FY 2002).
- Upland areas bordering Husky Brook, downstream from Husky Brook Lake (FY 2004).

Conversion to natural habitat should include allowing the grass in these areas to grow and planting a variety of trees that provide bird nest sites and wildlife food. This conversion would improve habitat quality and save vital installation operating funds. NJDFGW or nonprofit environmental groups (e.g.,



LEGEND

— Installation Boundary

— Road

Project Types

Areas for habitat expansion (AH2, MG2, TC1)

Areas for natural plantings, low-maintenance islands, and general habitat improvement (MG3)

Main Post Key Projects

Figure 5-2

The Nature Conservancy, the National Wildlife Federation's Backyard Habitat Program, the Audubon Society) should be consulted for species selection, planting, and maintenance advice

Create low-maintenance islands (FY 2000-2004). Another method that can be used by the installation to reduce mowing intensity and effort is the creation of low-intensity maintenance islands. Such islands can be established where grass mowing serves no functional purpose or where the islands can be visually incorporated into the landscape These islands might result from mowing around mass clumps of remnant forest trees or in open areas only every fourth week; planting ground covers, low shrubs, or wild flowers; maintaining large mulch or compost beds with mass bulb plantings; or using large clumps of urban forest plantings Efforts will be made to keep the islands visually pleasing and consistent with the IDG (Black and Veatch, 1991) by using irregular, flowing shapes. An example of such application would be the Boy Scout area east of Husky Brook Lake Islands could be established to leave adequate areas for annual camping, and the mowing schedule could be reduced to every third or fourth week Some test islands will be chosen and coordinated during the winter of 2000-2001 and implemented in the spring of 2001. They will be monitored for 1 to 2 years to determine their value and future application.

Mowing intensity on the remainder of installation lands has been reduced from twice per week to one time per week, and this intensity will be maintained in the future

The IDG provides the framework for planted areas on Fort Monmouth and is on file in the Master Planning Office It is the cornerstone of the installation master plan and ensures the maintenance of visual themes for different areas of the post, emphasizing function, visual context, and low maintenance It provides the criteria for developing attractive and functional landscape plantings within the context of natural resources management and would be referred to to ensure that expansion of natural vegetation occurs within the context of overall landscape design criteria at the installation

Improve habitat quality of maintained grounds (FY 2000-2004) The quality of maintained grounds as habitat can be improved by planting vegetation that provides high-quality food and cover for wildlife and by developing edge habitat along rights-of-way and other boundaries Edge habitat is not to be established by any form of invasion into or disturbance of existing forest habitat. Planting native vegetation (trees, shrubs, and wildflowers) that has food and cover value for wildlife provides habitat variety for species that primarily inhabit other habitat types, such as riparian creeks and forest, but need a variety of habitats to meet all of their resource requirements Plantings can be interspersed with ornamental plantings or planted between buildings, in parking lot islands, along roads, and around large open areas (e.g , parade grounds) Such plantings should not interfere with grounds maintenance and could decrease the surface area of maintained land They are distinguished from low-maintenance islands, however, in that the plantings are meant to be permanent, and they are distinguished from areas converted from maintained grounds to natural vegetation by their interspersed nature and continued level of maintenance once established As stated above, NJDFGW and other nature conservation organizations can be consulted regarding this effort, as appropriate.

Other Management Alternatives Considered

Retain the actual acreage of maintained lands in their current state This management alternative represents the no action alternative for maintained grounds It will be the management alternative implemented until grounds suitable for conversion to natural vegetation have been identified and a plan for the conversion has been approved Over the long term, however, this alternative represents a greater financial burden for Fort Monmouth than conversion of some areas to natural vegetation. It is also less supportive of the long-term ecological health of upland communities on the installation.

5.3.3 Aquatic Habitat Management

The primary objective of aquatic habitat management on Fort Monmouth is to maintain or improve the quality of aquatic habitat on the installation such that it provides a healthy environment for the aquatic flora and fauna of the installation. Aquatic habitat management is the primary method used to manage aquatic wildlife on the installation, and water quality in Husky Brook Lake and the streams on the installation is used as an indicator of the health of the installation's natural resources.

Management Measures: Brooks and Ponds

Maintain habitat quality along brooks and streams (FY 2000-2004). Habitat quality along brooks and streams will be maintained and improved through the maintenance of good vegetative cover along streambanks, structural stabilization and establishment of vegetative cover along degraded stretches of streams, and the avoidance of physical and chemical disturbances in or near watercourses. An initial survey of streambank condition should be completed (FY 2001) to locate areas that are eroding into adjacent streams and lack vegetative cover. These will be priority areas for stabilization with vegetative cover, rocks, logs, erosion prevention fabric, or other suitable means. Areas so stabilized will be monitored and maintained as necessary.

Improve aquatic habitat and water quality (FY 2001-2004). (See also Maintained Grounds Management: Convert maintained grounds to natural vegetation.) Riparian areas are critical to ensuring good water quality and healthy in-stream habitats. The growth of wide areas of riparian vegetation (including tree, shrub, and herbaceous layers) bordering brooks, streams, and ponds will be encouraged where maintenance of the areas is not necessary for aesthetic or functional reasons. Wider riparian areas will increase the habitat value of streams and brooks, decrease the potential for streambank erosion, improve in-stream habitats, and help decrease the need for and cost of grounds maintenance. Widened riparian areas will be protected by buffers of upland natural vegetation as discussed in Section 5.3.2.

Candidate locations for minimizing maintenance and planting or otherwise encouraging riparian vegetation growth include the following (see Figure 5-2):

- Wampum Brook, from Avenue of Memories to Lafetra Creek (FY 2002).
- Upland areas bordering Husky Brook, upstream from Oceanport Creek (FY 2002).
- Upland areas bordering Husky Brook, upstream from Husky Brook Lake (FY 2004).

These areas complement those selected for conversion of maintained grounds to natural vegetation since the contiguous development of wetland and upland vegetation will help create habitat diversity and provide increased water quality protection for streams and brooks. The first two of these areas also coincide with areas selected for stream bank stabilization and erosion control, and the two efforts will be fully coordinated.

In-stream aquatic habitat can be improved or restored by widening brooks in select locations and installing logs, rocks, and other natural "debris" to create habitat diversity. Diverse and healthy invertebrate populations depend on such habitat diversity, and invertebrates are a vital food source for amphibians, birds, fish, and mammals that forage in riparian and aquatic habitats. Areas that should be examined for the potential to increase in-stream habitat quality and diversity include the following (see Figure 5-2):

- Husky Brook, upstream of Husky Brook Lake (FY 2001-2003). This particular stretch of the brook might benefit from increased stream diversity and planting of wetland vegetation, which might help improve the quality of water entering the lake.

- Husky Brook, upstream of Oceanport Creek (FY 2001-2003). A wide area of maintained grounds on either side of the brook in this area and a deteriorating streambank indicate that this stretch of the brook could also benefit from increased habitat and diversity. The stream bank along this reach of Husky Brook will be stabilized under DPW's stream bank stabilization and erosion control effort.

Because of the presence of the golf course on the Charles Wood Subpost, the growth of additional riparian vegetation along Mill Brook will not be encouraged.

Monitor the quality of riparian and aquatic habitats (FY 2000-2004). Periodic monitoring of habitats near and in streams and ponds will provide advance warning of any developing problems. Monitoring might take the form of water and soil sampling; observations of wildlife use of riparian areas, streams, and ponds; or macroinvertebrate sampling. Macroinvertebrate sampling should be conducted annually or seasonally once habitat diversity and condition are improved by the means described above. The monitoring results will provide useful information about the success of the management approach, and the habitat and water quality of the brooks.

Evaluate the potential of the habitat of Husky Brook Lake to serve as a recreational fishery (FY 2004). The potential for Husky Brook Lake to support a larger fish population than that supported in the past and to support recreational fishing will be evaluated. Husky Brook Lake has been managed in the past for recreational fishing using fish stocking, though without sustained success. Water quality problems are suspected to be the cause of the lake's inability to sustain a natural fishery. The Canada goose population of the lake, whose droppings might be causing dissolved oxygen problems, might need to be controlled. Input of contaminated runoff from off-post sources is another potential source of water quality problems in the lake. Controlling one or both of these sources is a potential means to improve water and habitat quality in the lake.

Water quality studies of the lake will be necessary to determine the actual cause of water quality problems. After this cause is identified, the suitability of the lake to support a fishery should be determined. Sampling should be done upstream of, within, and downstream of the lake and should be geared toward determining the sources and types of pollution hindering lake water quality, as well as the suitability of the lake for a sustainable fish population. At a minimum, dissolved oxygen, fecal coliform, and water clarity should be sampled twice annually in FY 2000 and 2001 and annually in FY 2002 to 2004. Macroinvertebrate sampling could be used as an indicator of overall water quality and long-term changes in water quality. NJDFGW should be consulted concerning the availability of metrics for macroinvertebrate sampling. Any fishery established in the lake will be managed at a low level of intensity designed to be within the ecological capacity of the lake.

Resolve the fishing fee conflict (FY 2004). The Sikes Act and Army regulations require that fees collected for fishing be deposited in account number 21X5095; the proceeds may be used only for fish and wildlife management and administration. The Army regulations also allow a recreational fee to be charged, but proceeds from this fee have a broader array of uses. A fishing fee is currently charged but not deposited in account 21X5095. Since there is no fisheries management of Husky Brook Lake, it is likely that this fee is actually a recreation fee.

Other Management Alternatives Considered: Brooks and Ponds

Maintain brooks and streams on the installation in their current state. Currently the brooks, streams, and ponds (including Husky Brook Lake) on the maintained portions of the installation do not provide quality aquatic and riparian habitats. The riparian areas along the streams and brooks are too narrow to support a

tree canopy that would provide shade, which is an important component of a healthy aquatic habitat. They are also too narrow to

- Provide benefit as cover or food production for animals.
- Function as corridors for the movement of animals between tidal creeks and inland habitats for the conduct of different aspects of their natural histories.
- Protect against streambank failure and soil erosion.
- Filter runoff for the protection of water quality.

For these reasons, the riparian portions of brooks and streams must be improved if the installation is to move toward an ecosystem-based approach to natural resources management.

Management Measures: Tidal Creeks

Maintain and improve water quality in tidal creeks (FY 2000-2004). Water quality in tidal creeks can best be maintained or improved by reducing and avoiding impacts from other land management practices. For instance, herbicide and pesticide applications and soil disturbance should not occur near the tidal creeks. If these activities must occur in the vicinity of the creeks, chemicals that are innocuous to aquatic animals should be used and all means necessary to avoid erosion should be employed. Water quality in Oceanport Creek and Parkers Creek is affected by land uses other than Fort Monmouth, but Fort Monmouth can contribute to good water quality in the creeks by controlling its impact on these resources. Other practices to implement for controlling impacts to water quality in the creeks include the following:

- Ensuring that clean boating practices are used by all boaters at the marina. Practices include maintaining engines properly to reduce emissions to both the air and water; disposing of all trash at the marina; conducting any in-water boat washing with nonpolluting substances or water alone; handling all petroleum-based compounds at the marina in a nonpolluting manner, such as ensuring that all spills are promptly cleaned up or absorbed and disposing of all oil- or gasoline-soaked materials where no leakage to surface or ground waters will occur.
- Protecting the streams and brooks on the installation from water quality impacts because these are tributaries of the tidal creeks.

Maintain and improve riparian habitat along tidal creeks (FY 2000-2004). (See also Maintained Ground Management: Convert maintained grounds to natural vegetation.) Where appropriate, encourage additional growth of riparian vegetation along Parkers Creek, Lafetra Creek, and Oceanport Creek where maintained grounds are not necessary and do not contribute to the military mission. Candidate locations for expansion of riparian vegetated areas include the following (see Figure 5-2):

- Along Parkers Creek and Oceanport Creek where space permits (FY 2002).
- The entire length of Lafetra Creek where it borders the installation (FY 2004).

This should be accomplished in the same manner as discussed for upland and riparian habitat expansion. (See discussion above in this section and in Section 5.3.2.) Under DPW's stream bank stabilization and erosion control project, a portion of Lafetra Creek and Parkers Creek will be stabilized and their riparian habitats improved as a result. These stabilization projects will be fully coordinated with habitat improvement efforts.

Other Management Alternatives Considered: Tidal Creeks

Other management alternatives were examined but eliminated from consideration because they would have afforded less protection to the tidal creeks or would not have resulted in habitat improvement along

the tidal creeks. Tidal creeks border the eastern end of the installation on its northern and southern edges and are a prominent natural element of the installation, connecting it physically to the Atlantic Ocean and providing installation personnel with recreational opportunities. In light of the creeks' prominence, their importance to the character of the installation, and the importance of this type of habitat to wildlife, adopting management alternatives that would not have protected or improved these habitats was not considered to be in line with the goal of ecosystem protection and ecosystem-based management.

5.4 WATER QUALITY MANAGEMENT

The primary objective of water quality management at Fort Monmouth is to improve water quality within brooks and ponds (including Husky Brook Lake) and maintain it at a level that supports a natural assemblage of aquatic plants and animals. Water quality is dependent on water body management at Fort Monmouth (for example, controlling sediment runoff, controlling infiltration from leaking sewer systems, and maintaining balanced populations of aquatic plants) and on the quality of water when it enters Fort Monmouth. Mill Brook and Husky Brook both enter Fort Monmouth with off-site contamination. Fort Monmouth cannot control these inputs of contamination. Therefore, the goal of water quality management at the installation is to maintain riparian areas and aquatic systems in such a state that they can act as filters and cleansers of the waters as they pass through the installation, and to manage the installation's aquatic resources to maintain water quality as the waters pass through the installation to Oceanport and Parkers creeks.

Management Measures

Investigate the cause of poor water quality in Husky Brook Lake (FY 2000-2004). Water quality testing and monitoring will be done to characterize the sources of pollutants and current state of Husky Brook Lake. See also the discussion in Section 5.3.3 under *Brooks and Ponds: Evaluate the potential of the habitat of Husky Brook Lake to serve as a recreational fishery.*

Improve water quality in Husky Brook Lake (FY 2002-2004). Depending on the results of the characterization mentioned above, measures will be taken to improve water quality in Husky Brook Lake.

- If upstream sources of pollution are determined to be the cause of poor water quality, widening Husky Brook west of Husky Brook Lake, creating a wider streambed with some undulations in its shape (i.e., such that is does not flow in a straight line into the lake), and planting wetland vegetation along its banks could be investigated as a means to improve water quality. Wetland vegetation can serve as an excellent filter of water pollution. The areas to either side of Husky Brook between the lake and the installation border provide adequate space for expansion of the wetland habitat. Wetlands experts should be consulted about species selection and stream modification if this management measure is pursued.
- If inputs of organic matter are found to be a cause of poor water quality, USFWS and NJDFGW will be consulted regarding controlling the Canada goose population on Husky Brook Lake. The increasing goose population and presence of large quantities of droppings in and near the lake are suspected of contributing to poor water quality. See also Section 5.6, *Pest Management: Control the Canada goose population on Husky Brook Lake.*
- Other methods to improve water quality will be proposed based on the results of the characterization effort, and it is likely that some combination of measures will be required because more than one pollution source probably contributes to poor water quality in the lake.

Continue to monitor water quality in all installation waters (FY 2000-2004). Brooks on the installation enter from off site and carry pollutants from off-post sites. The installation will continue to monitor water quality in all brooks where they enter the installation and at other locations on installation property.

Other Management Alternatives Considered

More intensive protective measures, including construction of water quality control structures and a more ambitious program of conversion to natural communities, were considered but eliminated from consideration. The freshwater water bodies on the installation are not known to support endangered, threatened, or rare species or to be critical elements of expansive natural communities. They support natural communities only to the extent that they have been allowed to exist within the context of surrounding land uses. A more intensive program of habitat and water quality improvement might be justified were the brooks, streams, and ponds more important from an ecological point of view. However, given the limited value of the habitat, a more intensive program was not considered necessary.

A less intensive approach to water quality protection and improvement, including taking no steps to improve water quality in streams, brooks, and Husky Brook Lake, was also eliminated from consideration because current water quality in the water bodies is not capable of supporting natural aquatic populations and is not indicative of successful ecosystem-based natural resources management.

5.5 WILDLIFE MANAGEMENT

The primary objective of wildlife management at Fort Monmouth is to protect the fish and wildlife species, and by extension their habitats, on the installation toward maintaining or increasing the abundance and biodiversity of native species. An active wildlife management program, involving methods such as hunting or tagging and recapture, is not in effect at Fort Monmouth. Wildlife management at the installation primarily consists of habitat maintenance. Limited wildlife management occurs as pest control and manipulation of fisheries in Husky Brook Lake.

5.5.1 Endangered, Threatened, and Rare Species Management

On 27 September 1994 the Deputy Under Secretary of Environmental Security, U.S. Department of Defense signed a Multi-agency Memorandum of Understanding (MOU) on Implementing the ESA. The purpose of the MOU was to establish a general framework for greater cooperation and participation among the agencies exercising their responsibilities under the ESA. The MOU states that the departments will work together to achieve the common goals of (1) conserving listed species, (2) using existing federal authorities and programs to further the purposes of the ESA, and (3) improving the efficiency and effectiveness of interagency consultations conducted pursuant to Section 7(a) of the ESA. Each signatory agreed to (1) use its authorities to further the purposes of the ESA by carrying out programs for the conservation of federally listed species, including implementing appropriate recovery actions that are identified in recovery plans; (2) identify opportunities to conserve federally listed species and the ecosystems on which they depend within existing programs and authorities; (3) determine whether its respective planning processes effectively help conserve threatened or endangered species; (4) use existing programs, or establish a program, to evaluate and reward the performance of personnel who are responsible for planning or implementing programs to conserve or recover listed species or the ecosystems on which they depend.

The ESA requires all federal agencies to conserve listed species. Conservation, as defined by the ESA, means the use of all methods and procedures necessary to bring any listed species to the point where protections pursuant to the act are no longer necessary. Species that are candidates for federal listing or are state-listed as endangered, threatened, rare, or of special concern are not protected under the ESA. Because candidate species might be listed in the future, installations are required to avoid taking actions that result in the need to list candidates as endangered or threatened and are encouraged to participate in conservation agreements with the USFWS. Although not required to do so, installations are encouraged to develop Endangered Species Management Plans (ESMPs) for candidate species (HQDA, 1995). At a

minimum, installations are required to document the distribution of candidate species on the installation and monitor their status. For state-listed species, installations are encouraged to cooperate with state authorities in efforts to conserve these species.

Fort Monmouth has consulted with USFWS in the past regarding the presence of endangered and threatened species on the installation. In January 1994, USFWS requested that palustrine forested wetlands within the Charles Wood Subpost and the Main Post be surveyed for swamp pink. Fort Monmouth provided USFWS with the results of a wetland delineation survey conducted on the Charles Wood Subpost. After reviewing the results, USFWS provided concurrence with the Army's determination that except for an occasional transient bald eagle (*Haliaeetus leucocephalus*, recently removed from the list of threatened species) or peregrine falcon (*Falco peregrinus*), no other federally listed or proposed threatened or endangered flora or fauna are known to occur within the vicinity of the Charles Wood Subpost. USFWS has requested the results of an assessment of habitat suitability or any surveys conducted for swamp pink at the Main Post.

Currently no endangered, threatened, or rare species are known to occur on Fort Monmouth.

Management Measures

Conduct surveys (FY 2000). A PLS for federally listed endangered and threatened species will be conducted on the installation to determine the presence or absence of such species that are known to occur within Monmouth County, New Jersey, and likely to occur on Fort Monmouth. The initial list of species to survey for includes the northern bog turtle and swamp pink. The bog turtle is threatened by habitat degradation and fragmentation from agricultural development, habitat succession due to invasive exotic species and native plants, and illegal trade and collecting. The species is sparsely distributed over a discontinuous geographic range from New England to northern Georgia and is separated into distinct northern and southern populations by a 250-mile gap in its range. Bog turtles are semiaquatic and active in the northern part of their range only from April to mid-October. They inhabit shallow, spring-fed fens, sphagnum bogs, swamps, marshy meadows, and pastures that have soft, muddy bottoms; clear, cool, slow-flowing water; and open canopies. These habitats are a mosaic of microhabitats, including dry pockets, saturated areas, and areas that are periodically flooded. Bog turtles depend on this diversity of habitat, and as ecological succession transforms a suitable habitat into a closed-canopy, wooded swampland, the habitat becomes unsuitable for bog turtles (USFWS, 1997).

The only other species likely to occur on the installation is the swamp pink, and this species was not encountered during an extensive wetland delineation on the installation (Versar, 1998). New Jersey supports the largest and most numerous populations of swamp pink, with 68 existing sites spread over 12 counties in the coastal plain area. The species is one of the first to bloom in the spring (usually March to May). It usually occurs in clusters of 30 to 50 plants in wetland habitats, including Atlantic white cedar (*Chamaecyparis thyoides*) swamps, Blue Ridge swamps, swampy forested wetlands that border small streams, meadows, and spring seepage areas. It requires a saturated but not flooded area and is usually associated with Atlantic white cedar, pitch pine, American larch (*Larix laricina*), and black spruce (*Picea mariana*). Loss of wetlands to urban and agricultural development and to timber operations was the initial reason for the species' decline. It is now threatened by habitat losses due to water withdrawals for irrigation, sewage treatment plant discharges, siltation due to soil erosion, and excessive additions of nutrients and chemicals to surface waters (USFWS, 1990).

Targeted surveys will be conducted as necessary to ensure that the installation is managing its natural resources within the requirements of laws and Army regulations related to endangered and threatened species. All survey results, including the survey method used and the qualifications of the surveyor, will

be forwarded to USFWS in Region 5 and the New Jersey Field Office. Results of the 1998 wetland delineation will be forwarded to those offices as well.

Section 7 Consultation (FY 2000-2004). Fort Monmouth will engage in necessary ESA Section 7 consultation with the USFWS, New Jersey Field Office with respect to any activities that Fort Monmouth is considering undertaking, funding, permitting, or authorizing that have a potential impact on endangered and threatened species at the installation.

Support recovery efforts (FY 2000-2004). Management programs to assist in the recovery of federally listed endangered and threatened species, as directed by USFWS or NJDFGW, will be supported. Since no such species are known to exist on Fort Monmouth, currently there are no special management efforts for them. However, if any species is found to occur on the installation or if it is determined that habitats for endangered, threatened, or rare species exist on the installation, Fort Monmouth will consult with USFWS, NJDFGW, and the New Jersey Natural Heritage Program to determine the proper measures to assist in the recovery of the species.

AR 200-3 requires installations to prepare ESMPs for each listed and proposed species and critical habitat present on the installation, including areas used by tenant organizations. Installations requiring more than one ESMP (i.e., more than one listed or proposed species present) are permitted to prepare a combined ESMP provided the combined plan satisfies the substantive requirements detailed in AR 200-3, Chapter 11-5(b)(3 and 4). Installation ESMPs must prescribe the area-specific measures necessary to meet the installation's conservation goals for the subject species and critical habitats (HQDA, 1995). In March 1995, the U.S. Army Environmental Center published the *Manual for the Preparation of Installation Endangered Species Management Plans* to provide a standard and comprehensive format for preparing ESMPs.

Other Management Alternatives Considered

Because of the apparent absence of endangered and threatened species on the installation, a more intensive approach to endangered and threatened species management was not considered necessary. A less intensive approach, which would not have included surveys for species that might occur on the installation, would not have been in compliance with the installation's responsibility for the conservation and recovery of endangered and threatened species and was therefore eliminated from consideration.

5.5.2 Nongame Species Management

Nongame species on the installation would be expected to benefit from the management measures already discussed under Section 5.3.1, Forest Habitat Management (*Leave dead and dying trees for cavity nesting species*); Section 5.3.2, Maintained Grounds Management (*Convert maintained grounds to natural vegetation, Improve habitat quality of maintained grounds*); and Section 5.3.3, Aquatic Habitat Management (*Improve habitat quality and water quality* [along brooks, ponds, and tidal creeks]). Additional measures discussed below target specific nongame species or groups of species.

Management Measures

Maintain and improve the quality of existing habitats (FY 2000-2004). There are currently no programs in effect at Fort Monmouth specifically for nongame management. Improvement and management of wetlands and upland forested habitats to preserve their natural character and to encourage expansion of riparian vegetation and stream stabilization, as discussed in Sections 5.3.2 and 5.3.3, should benefit the nongame species that inhabit these environments. Areas converted from maintained grounds to natural vegetation, low-maintenance islands, and locations where vegetation is planted to create edge habitat (see

Section 5.3.2) are candidate locations for installation of birdhouses and large rocks or other natural features that can help increase small-scale habitat diversity, which is appropriate at Fort Monmouth where small animal species are the most prevalent.

Install nest boxes and shelters (FY 2001-2002). Opportunities might exist at Fort Monmouth for the installation of purple martin (*Progne subis*) houses. This migratory species has been undergoing a long-term population decline. Purple Martins are totally dependent on humans to provide housing. The birds prefer open locations relatively close to buildings at low elevations where aquatic habitat is plentiful. Both the golf course and areas near the tidal creeks might provide suitable locations for purple martin houses (see Appendix A). Eastern bluebirds (*Sialia sialis*) also prefer open areas and might benefit from the installation of birdhouses suitable for the species on the golf course. USFWS should be contacted at the New Jersey Field Office for possible technical assistance to determine if suitable habitat exists for these species and where houses might be installed.

Partners In Flight (PIF) Program Cooperation (FY 2000-2004). The PIF Program is concerned with the conservation of neotropical migratory birds and their habitats. Populations of these birds have been declining in recent years because of fragmentation of habitat on breeding grounds, deforestation and adverse agricultural practices on wintering grounds, pesticide poisoning, nest parasitism, and the cumulative effects of habitat changes along migration routes. The goals of PIF are as follows:

- To determine the status and specific causes of neotropical migratory bird declines.
- To maintain stable populations of species not in decline.
- To reverse declining population trends through habitat restoration and enhancement.

Management opportunities include the following:

- Inventory.
- On the ground management practices.
- Education.
- Long-term monitoring to determine changes in populations of these birds on the installation.

Efforts will be coordinated with the project partners to obtain their views on actions that could be conducted in cooperation with the PIF program.

The installation of bat houses on the sides of buildings should also be investigated. Bats are vital components of ecosystems and provide natural nuisance insect control. In the northern New Jersey area, crevice-dwelling species include the Keen myotis (*Myotis keeni*), little brown myotis (*Myotis lucifugus*), small-footed myotis (*Myotis subulatus*), silver-haired bat (*Lasionycteris noctivagans*), eastern pipistrel (*Pipistrellus subflavus*), red bat (*Lasiurus borealis*), big brown bat (*Eptesicus fuscus*), and hoary bat (*Lasiurus cinereus*). As many as 50 bats might occupy a bat house, depending on the size of the species. Organizations such as Bat International can be contacted for information on bat house construction and placement (see Appendix D).

Additional management measures for the protection of nongame species and improvement of their habitats should be developed in the future, based on information gained during the PLSs to be conducted in FY 2000, monitoring efforts, and surveys of wildlife use of areas converted to natural vegetation along brooks and creeks.

Other Management Alternatives Considered

Given the developed nature of the installation, a more intensive effort to manage for nongame wildlife was eliminated from consideration. More intensive management would be appropriate if nongame species of importance were present on the installation or if habitat important to the species were present but in need of improvement. However, the nongame species present on the installation are those normally associated with suburban, developed areas, and special programs to manage for these species are not considered warranted.

A less intensive program to manage for nongame wildlife, which would essentially consist of not undertaking programs for water quality management, water body protection, riparian area protection and expansion, and upland forested area management, was eliminated from consideration as not in line with responsible ecosystem-based natural resources management.

5.5.3 Transplants and Stocks

Management Measures

Stock fish in Husky Brook Lake for low-level recreational fishing (FY 2004). Once the water quality of Husky Brook Lake has been improved and can sustain a population of desirable fish, fish will be stocked in the lake to support a low level of recreational fishing. Rainbow and brook trout have been placed in Husky Brook Lake on an irregular basis for put-and-take fishing. This practice will be attempted again after the water quality investigations and characterization have been conducted and more is understood about the lake habitat and carrying capacity.

Other Management Alternatives Considered

A sustainable fishery on Husky Brook Lake is desirable, and it is unlikely that fish suitable for recreational fishing will establish themselves in the lake even if water quality is improved. Stocking fish is therefore the only viable option if a low level of recreational fishing is to be established. Measures taken to improve water quality in the lake and habitat surrounding the lake might reduce the level of stocking necessary and have the potential of making the fishery self-sustaining.

5.6 PEST MANAGEMENT

The primary objective of pest management at Fort Monmouth is to control nuisance wildlife that hinder accomplishment of the military mission or jeopardize the welfare of installation residents and personnel. Few wildlife pest problems occur on the installation (see Section 5.3.3 for a discussion of the Canada goose problem), and pest management is focused primarily on prevention of outbreaks of pests of ornamental plants (including diseases) and pests of medical importance.

Pesticide application work is contracted, and there is no permanent storage of pesticides on the installation. This approach reduces environmental risk at the installation and liability in the event of a spill.

Management Measures

Control the Canada goose population on Husky Brook Lake (FY 2002-2004). An increase in the Canada goose population occasionally necessitates the translocation of some individuals to unoccupied but appropriate habitat. This practice will continue to the extent that it is necessary for personal safety and

proper management of the lake. If the population of geese needs to diminished based on water quality studies at Husky Brook Lake, the following measures will be investigated for their control:

- Prohibit feeding. Feeding geese makes them less likely to migrate and more dependent on people.
- Install scarecrows. "Eyespot balloons" or another scarecrow that can be moved easily can be used to discourage geese from landing or using a particular area.
- Reduce the attractiveness of habitat. Long grassy strips where geese can land, and gently sloping access points to water can be eliminated (by planting shrubs or placing barriers, for instance).
- Install barriers to water access for goslings. Goslings need access to water, and installation of barriers such as fencing, woody shrubs, or tall, thick grass can discourage nesting.
- Plant species of grass not favored by geese. Tall fescue or mixes with periwinkle (*Vinca minor*), ivy (*Hedera helix*), myrtle (*Leiophyllum buxifolium*), or pachysandra (*Pachysandra procumbens*) make areas less appealing to geese.
- Harass geese. Harassment by using dog patrols, chasing geese, and making loud noises can deter geese from staying at a location. Geese are protected as migratory birds, and harassment cannot include touching, injuring, or killing the birds. Determine if local ordinances would prohibit the use of loud noises.

If these methods do not work, more dramatic measures might be necessary. If this is found to be the case, Fort Monmouth will coordinate with NJDFGW to determine if hunting, reproductive control, or depredation are feasible for use at the installation. Additional information about goose control is included in Appendix E.

Other Management Alternatives Considered

Alternatives other than those described above have not been considered. Assuming pesticide applications (i.e., not contracting the work out) would require a permanent pesticide storage facility on the installation. This is not desirable for the reasons stated above. Control of the Canada goose population is necessary if water quality in Husky Brook Lake is to be improved.

5.7 CULTURAL RESOURCES MANAGEMENT

The primary objective of cultural resources management at Fort Monmouth is to identify and protect cultural resources on the installation in accordance with the CRMP (Trierweiler et al., 1996). Before any soil disturbance or modification of structures, archeological surveys will be conducted to determine the probability of disturbing any archeological sites or historic structures that might be eligible for listing on the NRHP or that might be of significance to federally listed Native American tribes or groups. This will be done to protect historical resources and to satisfy Section 106 of the NHPA.

Management Measures

Integrate cultural resources regulatory requirements and investigations with other natural resources investigations (FY 2000-2004). When any ground disturbance or structural modification is to occur, DPW personnel in the Environmental Office will be notified as an early step in the planning process. The area or structure to be affected will be identified, coordination with Environmental Office personnel will be initiated, and any available information about the historical significance of the area or structure to be affected will be consulted.

To comply with the NHPA (Section 106) and the Archeological Resources Protection Act, the State Historic Preservation Office (SHPO) will be contacted to determine further necessary action. This action might require the completion of a Phase I archeological survey, including background research and

archeological excavations or surface surveys. If archeological sites considered to be potentially NRHP-eligible are found, further excavation work (Phase II and/or Phase III) might be required. If historic structures are involved, the approval of the SHPO for any proposed modifications or demolition will be obtained.

Other Management Alternatives Considered

Since protection of cultural resources is mandated by federal law and is of particular importance to the state of New Jersey, other management alternatives that would have afforded less protection to these resources were not considered.

5.8 INTEGRATION AND SUMMARY OF MANAGEMENT MEASURES

As stated in Section 5.1, the goal of the INRMP for Fort Monmouth is to protect and maintain the natural resources of the installation, to improve degraded habitats, and to manage the grounds of the installation in a manner that supports and benefits the local ecology and sustains the military mission. Tables 5-1 through 5-3 summarize the management measures and implementation schedules for each resource area.

Managing the natural resources of Fort Monmouth using an ecosystem approach implies that thought be given to the environmental consequences of activities at the installation. The potential effects of sediment runoff on aquatic organisms, for instance, will be considered when soil is disturbed for construction. Decisions to plant ornamental trees and shrubs will consider not only their appearance but also their value to wildlife as food, nesting, and shelter.

Table 5-1
Summary of Management Measures

Resource Area[1]	Management Measure	Implementation Schedule
	HABITAT MANAGEMENT	
FOREST HABITAT		
FH 1	Conduct a vegetative community and flora planning-level survey on the non-wetland forested areas of Charles Wood Subpost: • April, June, September • Figure 5-1	FY 2000
FH 2	Avoid disturbances to forested habitats: • Avoid disturbance through construction, excessive noise, air emission sources, cutting, recreational overuse	FY 2000-2004
FH 3	Leave dead and dying trees for cavity-dwelling species	FY 2000-2004
FH 4	Encourage the use and enjoyment of forested areas on Fort Monmouth: • Nature-oriented articles in a newsletter • Slide presentations • Photography contests, etc.	FY 2000-2004
FH 5	Periodically monitor forested areas: • Monitor for invasive species • Monitor for general forest condition	FY 2001-2004 (annually)
MAINTAINED GROUNDS		
MG 1	Implement erosion control measures: • Near surface waters • Replant bare spots	FY 2000-2004
MG 2 2.1 2.2 2.3	Convert maintained grounds to natural vegetation: • Along Lafetra Creek, Parkers Creek, Oceanport Creek • Along Husky Brook, upstream of Oceanport Creek • Husky Brook, upstream of Husky Brook Lake • Plant and maintain natural vegetation–permanent • Figure 5-2	 FY 2001 FY 2002 FY 2004
MG 3	Low-maintenance islands–less frequent maintenance, non-permanent	FY 2000-2004
MG 4	Improve habitat quality of maintained grounds: • Maintained ornamental and native plantings • Interspersed on grounds, between buildings, along rights-of-way, parking lot islands, surrounding large open areas	FY 2000-2004
	HABITAT MANAGEMENT	
AQUATIC HABITATS		
BROOKS AND PONDS		
AH 1 1.1	Maintain habitat quality along brooks and streams: • Survey streambank condition • Minimize disturbance • Maintain habitat (all streams and brooks)	FY 2000-2004 FY 2001
AH 2 2.1 2.2 2.3 2.4	Improve aquatic habitat and water quality: • Wampum Brook, Avenue of Memories to confluence with Lafetra Creek; stabilize stream banks • Husky Brook, upstream of Oceanport Creek; stabilize stream banks • Husky Brook, upstream of Husky Brook Lake • Investigate the value of widening brooks to increase in-stream habitat diversity: ▪ Husky Brook, upstream of Husky Brook Lake ▪ Husky Brook, upstream of Oceanport Creek • Figure 5-2	 FY 2002 FY 2002 FY 2004 FY 2001-2003 FY 2001-2003

Table 5-1
Summary of Management Measures (cont.)

Resource Area[1]	Management Measure	Implementation Schedule
AQUATIC HABITATS		
BROOKS AND PONDS		
AH 3	Monitor the quality of riparian and aquatic habitats	FY 2000-2004
AH 4	Evaluate the potential of the habitat of Husky Brook Lake to serve as a recreational fishery	FY 2004
AH 5	Resolve the fishing fee conflict	FY 2004
TIDAL CREEKS		
TC 1	Maintain and improve water quality in tidal creeks	FY 2000-2004
TC 2	Maintain and improve riparian habitat along tidal creeks:	
2.1	• Maintain habitat along both tidal creeks	FY 2000-2004
2.2	• Plant or encourage natural vegetation growth along Parkers Creek and Oceanport Creek; stabilize stream banks	FY 2002
	• Plant or encourage natural vegetation growth along Lafetra Creek; stabilize stream banks	FY 2004
	• Figure 5-2	
WATER QUALITY MANAGEMENT		
WQ 1	Investigate the cause of poor water quality in Husky Brook Lake:	
	• Seasonal water quality sampling	FY 2000-2001
	• Annual water quality sampling	FY 2002-2004
WQ 2	Improve water quality in Husky Brook Lake	FY 2002-2004
WQ 3	Continue to monitor water quality in all installation waters	FY 2000-2004
WILDLIFE MANAGEMENT		
ENDANGERED AND THREATENED SPECIES (none known to occur on the installation)		
ES 1	Conduct PLS for northern bog turtle and swamp pink:	FY 2000
	• Habitat suitability surveys	
ES 2	Support recovery efforts	FY 2000-2004
NONGAME SPECIES		
NS 1	Maintain or improve quality of existing habitats:	FY 2000-2004
	• See FH 2 & 3, MG 2, 3, & 4, AH 1 & 2, TC 2, WQ 2	
	• Habitat improvement and increased diversity	
NS 2	Install nest boxes and shelters:	FY 2001-2002
	• Purple martin and eastern bluebird house installation	
	• Bat house installation	
TRANSPLANTS & STOCKS		
TS 1	Stock fish in Husky Brook Lake for low-level recreational fishery:	FY 2004
	• After water quality and habitat improvement to increase fish survivability	
PEST MANAGEMENT		
PM 1	Control the Canada goose population on Husky Brook Lake:	FY 2002-2004
	• Prohibit feeding	
	• Install scarecrows	
	• Reduce the attractiveness of the habitat	
	• Install barriers to water access for goslings	
	• Plant species of grass not favored by geese	
	• Harass geese (without harming them)	
CULTURAL RESOURCES MANAGEMENT		
CR 1	Integrate cultural resources regulatory requirements and investigations with other natural resources investigations	FY 2000-2004

[1] Abbreviations for management measures correlate this table with Table 5-2.

Table 5-2

Management Measure Implementation Schedule: Ongoing Measures

MM[1]	Management Measure	2000	2001	2002	2003	2004	Comments
FH 2	Avoid disturbances to forested habitats	•	•	•	•	•	Avoid cutting, soil disturbance, excessive noise, etc.
FH 3	Leave dead and dying trees	•	•	•	•	•	For cavity-dwelling species and habitat diversity.
FH 4	Encourage the use and enjoyment of forested areas on Fort Monmouth	•	•	•	•	•	Newsletter articles, slide shows by local naturalists, photography contests, etc.
FH 5	Periodically monitor forested areas		•	•	•	•	For signs of invasive species, general forest health.
MG 1	Implement erosion control measures	•	•	•	•	•	Near surface waters; replant bare spots.
AH 1	Maintain habitat quality along brooks and streams:	•	•	•	•	•	Avoid disturbance to existing habitats.
1.1	Survey streambank condition		•				Determine where streambanks are eroding and need stability.
AH 3	Monitor the quality of riparian and aquatic habitats	•	•	•	•	•	For signs of bank erosion, sediment-laden runoff, etc.
TC 1	Maintain and improve water quality in tidal creeks	•	•	•	•	•	Avoid runoff to tidal creeks; encourage vegetative growth.
TC 2	*Maintain and improve riparian habitat along tidal creeks:*						*Avoid disturbance, chemical applications near tidal creeks.*
2.1	Maintain habitat along both tidal creeks	•	•	•	•	•	
WQ 1	Investigate the cause of poor water quality in Husky Brook Lake	seasonally	seasonally	annually	annually	annually	More frequent initially to determine seasonal sources.
WQ 3	Continue to monitor water quality in all installation waters	•	•	•	•	•	Inspect possibility of using biological sampling.
ES 2	Support endangered and threatened species recovery efforts	•	•	•	•	•	As appropriate; no endangered or threatened species are known to occur at the installation.
NS 1	Maintain and improve quality of existing habitats for nongame species	•	•	•	•	•	Birdhouses, bat houses, low-maintenance islands, riparian habitat expansion, etc. See FH 2&3; MG 2, 3, & 4; AH 1&2; TC 2; WQ 2.
CR 1	Integrate cultural resources regulatory requirements and investigations with other natural resources investigations	•	•	•	•	•	To comply with the NHPA and the Archeological Resources Protection Act and to protect valuable cultural resources.

[1] Management Measure (MM) abbreviations correlate this table with Table 5-1.

Table 5-3
Management Measure Implementation Schedule: Special Measures

MM[1]	Management Measure	2000	2001	2002	2003	2004	Comments
FH 1	*Conduct a planning-level survey* on the non-wetland forested areas of Charles Wood Subpost (April, June, September)	•					Community type and species identification.
MG 2	Convert maintained grounds to natural vegetation:						Where it won't interfere with grounds maintenance and installation activities. See also AH 2 and TC 2.
2.1	Along Lafetra Creek, Parkers Creek, Oceanport Creek		•				
2.2	Along Husky Brook, upstream of Oceanport Creek			•			
2.3	Along Husky Brook, upstream of the lake					•	
MG 3	Low-maintenance islands–less frequent maintenance, non-permanent	•	•	•	•	•	Decrease mowing frequency and intensity, and increase habitat diversity.
MG 4	Improve habitat quality of maintained grounds	•	•	•	•	•	See MG 1, MG 2, AH 1, AH 2, TC 2, NS 1.
AH 2	Improve aquatic habitat and water quality:						*Riparian habitat expansion and* maintenance is key for aquatic habitat and water quality protection. AH 2.2 and 2.3 focus on aquatic habitat quality improvement, but represent the same measures as MG 2.2 and 2.3; stabilize stream banks where eroded
2.1	Wampum Brook, Avenue of Memories to confluence with Lafetra Creek			•			
2.2	Husky Brook, upstream of Oceanport Creek			•			
2.3	Husky Brook, upstream of the lake					•	
2.4	Investigate the value of widening brooks to increase instream habitat diversity		•	•	•		Increase habitat diversity and integrity.
AH 4	Evaluate the potential of the habitat of Husky Brook Lake to serve as a recreational fishery					•	Evaluate potential after water quality improvement projects are implemented.
AH 5	Resolve the fishing fee conflict					•	First determine if stocking can continue or if water quality prevents fish survival.

Table 5-3
Management Measure Implementation Schedule: Special Measures (cont.)

MM[1]	Management Measure	2000	2001	2002	2003	2004	Comments
TC 2	Maintain and improve riparian habitat along tidal creeks:						Expand riparian areas, vegetative buffers.
2.2	Plant or encourage natural vegetation growth along Lafetra Creek, Parkers Creek, and Oceanport Creek			•		•	This measure repeats MG 2.1 and is similar to AH 2, but focuses on tidal creeks; stabilize stream banks where eroded
WQ 2	Improve water quality in Husky Brook Lake			•	•	•	See AH 1, AH 2, MG 2, WQ 1, PM 1.
ES 1	Conduct endangered and threatened species PLS	•					Focus on swamp pink and bog turtle.
NS 2	Install nest boxes and shelters		•	•			Purple martin and eastern bluebird houses, bat houses
TS 1	Stock fish in Husky Brook Lake for low-level recreational fishery					•	After water quality and habitat improvement measures are implemented.
PM 1	Control the Canada goose population on Husky Brook Lake			•	•	•	Concurrently with water quality monitoring, habitat and water quality improvement measures.

[1] Management measure (MM) abbreviations correlate this table with Table 5-1.

SECTION 6.0: IMPLEMENTATION OF THE INRMP

6.1 ORGANIZATION, ROLES, AND RESPONSIBILITIES

The ecosystem approach described in this INRMP to manage the natural resources of Fort Monmouth can be implemented by the existing DPW at Fort Monmouth with assistance from other personnel at the installation. DPW has the primary role and responsibility for the implementation of this INRMP, which is in effect from FY 2000 through FY 2004. No changes of organization are expected, or necessary, to implement this INRMP.

6.2 WORKFORCE

6.2.1 Staffing

The professionally trained natural resources management personnel at Fort Monmouth are necessary to implement this INRMP. The personnel who constitute the current natural resources management staff at Fort Monmouth are listed in Table 6-1.

Table 6-1
Fort Monmouth Natural Resources Management Staff

Number	Position	Status
1	Environmental Coordinator	Half-time, permanent
1	Master Planner	One-quarter time, permanent
1	Grounds Maintenance Specialist	One person-year annually

6.2.2 Outside Assistance

Contractor. The commercial activities contractor has a horticulturist who assists in planting layouts. He has developed landscaping designs and advised the Command on types of shrubbery needed, turf and tree grooming techniques, and pest and disease prevention and control. Pesticide applications and grass mowing are performed by contract.

Implementation of the projects discussed in this INRMP might require outside assistance, primarily in the form of consultation. State and federal agencies and contractors might be required to provide expert opinions on matters such as maintenance of wetlands and vegetative plantings for habitat improvement. Normally, those providing such assistance will do so within the context of their normal job duties and reimbursement will not be required.

6.3 PROJECT/PROGRAM PRIORITIES

The Office of Management and Budget considers funding for the preparation and implementation of this INRMP, as required by the Sikes Act, and the associated NEPA analysis and documentation to be a high priority. However, the reality is that not all of the projects and programs identified in this INRMP will receive immediate funding. These programs and projects have therefore been placed into three priority-based categories: (1) High-Priority Projects, (2) Important Projects, and (3) Projects of Lesser Importance. The prioritization of the projects is based on need, and need is based on a project's importance in moving the natural resources management program towards successfully achieving its goals. However, placement in a category such as High-Priority Projects, does not guarantee that a project will be funded. The time

frame during which these projects are to occur is provided in parentheses following the project description.

Fort Monmouth, USFWS, NJDEP, and NJDFGW recognize that year-to-year congressional appropriations for the implementation of the Army's mission may reflect different priorities. If these priorities require deferral, redirection, or cancellation of planned projects or plans, Fort Monmouth, in consultation with AMC, will determine which projects or plans should be implemented first. Projects that require funding will proceed only after funding has been obtained. Nothing in this plan can be interpreted to violate the Anti-Deficiency Act. In every case, Fort Monmouth and AMC will ensure that constraints on the military mission are minimized and avoided wherever possible.

6.3.1 High-Priority Projects

- Implement ecosystem principles in managing natural resources at Fort Monmouth (FY 2000-2004).
- Conduct a vegetative community and flora PLS of the non-wetland forested areas (FY 2000).
- Conduct a PLS for federally listed endangered and threatened species (FY 2000).
- Implement erosion control measures (FY 2000-2004).
- Continue to monitor water quality in all installation waters (FY 2000-2004).
- Convert maintained grounds to natural vegetation (FY 2001-2004).
- Maintain habitat quality along brooks and streams (FY 2000-2004).
- Investigate the cause of poor water quality in Husky Brook Lake (FY 2000-2004).
- Improve water quality in Husky Brook Lake (FY 2002-2004).

6.3.2 Important Projects

- Periodically monitor forested areas (FY 2000-2004).
- Improve the habitat quality of maintained grounds (FY 2000-2004).
- Maintain and improve riparian habitat along tidal creeks (FY 2000-2004).
- Monitor the quality of riparian and aquatic habitats (FY 2000-2004).
- Improve aquatic habitat and water quality (FY 2002-2004).
- Control the Canada goose population on Husky Brook Lake (FY 2000-2004).
- Integrate cultural resource regulatory requirements and investigations with natural resource investigations (FY 2000-2004).

6.3.3 Projects of Lesser Importance

- Avoid disturbances to forested habitats (FY 2000-2004).
- Maintain and improve water quality in tidal creeks (FY 2000-2004).
- Support recovery efforts for endangered and threatened species (FY 2000-2004).
- Encourage the use and enjoyment of forested areas (FY 2000-2004).
- Evaluate the potential of the habitat of Husky Brook Lake to serve as a recreational fishery (FY 2004).
- Resolve the fishing fee conflict (FY 2004).
- Stock fish in Husky Brook Lake for low-level recreational fishing (FY 2004).

6.4 IMPLEMENTATION OF FUNDING OPTIONS

The natural resources program at Fort Monmouth receives financial support from appropriated funds (e.g., Operations and Maintenance). Funding requirements for Army environmental programs (including

natural resources and cultural resources programs) are identified in the Environmental Program Requirements (EPR) reporting process. Projected funding for implementation of the INRMP from 2000 through 2004 is provided in Table 6-2. These estimates will be adjusted each year as needed.

Table 6-2
EPR for Fort Monmouth Natural Resources Program

Project	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	Total
Soil Conservation	$5,000	$4,000	$4,500	$4,500	$5,000	$23,000
Endangered and Threatened Species Survey	$0	$0	$0	$0	$40,000	$40,000
Totals[a]	$5,000	$4,000	$4,500	$4,500	$45,000	$63,000

[a] This figure represents the total salaries necessary to maintain and operate the Environmental and Natural Resources Program at Fort Monmouth. Assumes a 2.5 % rate of inflation.

6.5 COMMAND SUPPORT

The land on Fort Monmouth has been and is entirely capable of supporting the military mission since it is not subjected to degradation from training exercises. Management of natural resources will not detract from the primary mission and should enhance the quality of living for residents and installation personnel.

The Installation Commander and other personnel in command positions at Fort Monmouth fully support implementation of this INRMP. The command is dedicated to ensuring the long-term sustainability of the natural resources and the management of those resources necessary to support the military mission.

Command support is essential for the implementation of this INRMP. Also, in accordance with AR 200-3, the Sikes Act, and other federal laws, the commander of Fort Monmouth is personally liable for noncompliance with the environmental laws related to this INRMP and therefore has a personal interest in ensuring the full and complete implementation of the plan.

6.6 PLAN REVIEW

DPW will conduct a review of this INRMP each year in light of the preceding year's accomplishments.

SECTION 7.0: ENVIRONMENTAL CONSEQUENCES

This section of the document assesses known, potential, and reasonably foreseeable environmental consequences related to implementing the INRMP and managing natural resources at Fort Monmouth. Section 7.1 addresses implementation of the no action alternative, which reflects the continuation of existing baseline conditions as described in Section 3.0. Section 7.2 presents potential effects of the preferred alternative, or implementation of this INRMP. This assessment is organized by resource area (as presented in Section 3.0) and considers implementation of the selected management measures in their entirety (as presented in Section 5.0). Cumulative effects are discussed in Section 7.3. A summary of the potential environmental consequences associated with the no action alternative and the preferred alternative is presented in Section 7.4.

As discussed in Section 1.4.5, Description of the Proposed Action and Alternatives, the EA addresses two alternatives—the preferred alternative and the no action alternative. Other management alternatives were considered but eliminated because they were economically or logistically impractical, or unnecessary from a natural resources management point of view. Section 5.0, Natural Resources Management, provides a description of the methods used to develop management measures for each resource area and the rationale for why certain management measures were selected. Therefore, the analytical framework supporting the management measures for each resource area is not repeated in this section. This approach supports Army guidance for concurrent preparation and integration of the INRMP and NEPA documentation.

As discussed in Section 1.4.5, the Fort Monmouth INRMP focuses on a 5-year planning period based on past and present actions. Short-term management practices included in the plan have been developed without compromising long-range goals and objectives. Because the plan will be modified over time, additional environmental analyses might be required as new management measures are developed over the long term (beyond 5 years).

7.1 NO ACTION ALTERNATIVE

Adoption of the no action alternative would mean that Fort Monmouth's INRMP would not be implemented and current natural resource management practices at Fort Monmouth would continue to be implemented as they currently are. Existing conditions and management practices presented in Section 3.0, Affected Environment, would continue and no new initiatives would be established. As described below, no significant or adverse effects would be expected under the preferred alternative. Under the no action alternative, environmental conditions at Fort Monmouth would not benefit from the management measures associated with implementing the proposed INRMP.

Ecoregion and Local Setting. No effects would be expected. The general environmental setting of Fort Monmouth within an ecoregional and local context would not be affected by adoption of the no action alternative.

Climate. No effects would be expected.

Land Use and Airspace Use. No effects would be expected. Under the no action alternative, no changes to on-site land uses or land use patterns would occur. Because installation land uses would not be expected to change, off-site land use patterns would not be affected.

Air Quality. No effects would be expected. Sources of air emissions at Fort Monmouth would not change as a result of implementing the no action alternative.

Noise. No effects would be expected. Sources of noise at Fort Monmouth would not be affected by implementing the no action alternative.

Water Quality. No effects would be expected. Water quality in the brooks and ponds of the installation would be expected to remain unaffected with adoption of the no action alternative.

Topography. No effects would be expected. The topography of Fort Monmouth would not be affected by implementing the no action alternative.

Geology. No effects would be expected. The underlying geologic structure of Fort Monmouth would not be affected by adoption of the no action alternative.

Soils. Minor adverse effects would be expected. Failure to implement erosion management measures could result in minor adverse impacts on soils. Under the no action alternative, no increased effort to repair disturbed soils would be made, potentially resulting in sediment loss and decreased soil productivity.

Petroleum and Minerals. No effects would be expected.

Water Resources. No effects would be expected. Implementation of the no action alternative would not affect the physical structure or presence of surface waters or ground water on the installation. Separate discussions apply to water quality and aquatic habitats.

Infrastructure. No effects would be expected. All elements of infrastructure would continue to be maintained and operated in accordance with required permits and capabilities of the systems. Under the no action alternative, demands for utilities and roads would not be expected to change.

Hazardous and Toxic Materials. No effects would be expected. All hazardous and toxic materials would continue to be handled in accordance with federal laws and Army regulations, including the Resource Conservation and Recovery Act (RCRA); the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA); the Toxic Substances Control Act (TSCA); and AR 200-1. Thus, no adverse effects regarding the generation of hazardous and toxic materials would be expected under the no action alternative.

Upland Habitats. Minor adverse effects would be expected. Under the no action alternative, in which the upland forested areas on the installation receive little to no focused management, it would be foreseeable that the overall condition of these habitats would deteriorate over time because of a lack of control of invasive species, lack of management geared at maintaining or increasing biodiversity, and loss of some upland habitat to development pressure if the habitats are not managed, and their use by installation and noninstallation personnel encouraged, as valuable resources of the installation. No effects on maintained grounds would be expected.

Wetlands and Riparian Habitats. Minor adverse effects would be expected. The no action alternative does not provide measures for protecting wetlands from other installation land management practices or for improving the protection of wetlands. Neither does it provide for establishing or improving vegetative cover in riparian areas. Some wetlands and their associated riparian habitats on the installation, including Husky Brook and Mill Brook, are currently in a degraded state; without intervention, they could be expected to deteriorate further.

Flora. No effects would be expected. The installation supports a limited variety of flora that is adapted to the developed nature of the installation. Continuing with current management practices would be expected to maintain current floral diversity and ecological health.

Fauna. No effects would be expected. Like the flora of the installation, the fauna is composed of species typically found in suburban environments that contain interspersed natural areas. The assemblage of fauna on the installation would be expected to remain as it currently is with no changes in management.

Preserves, Special Habitat, and Significant Natural Areas. No effects would be expected. The installation does not currently contain natural areas of particular significance to protected species or within a regional ecosystem context.

Endangered, Threatened, and Rare Species. No effects would be expected. No federally listed endangered, threatened, or rare species are known to occur on the installation.

Cultural Resources. No effects would be expected. Adoption of the no action alternative would not affect adherance to the guidelines and protocols of Fort Monmouth's CRMP. Coordination and integrated management of cultural and natural resources would not be accomplished under the no action alternative.

Socioeconomic Resources. No effects would be expected. Implementation of the no action alternative would not be expected to have an effect on socioeconomic resources.

Environmental Justice. No effects would be expected. Existing conditions would continue under this alternative. The primary concern regarding environmental justice and potential environmental effects pertains to the occurrence of disproportionately high and adverse consequences to children or minority and low-income communities. The no action alternative in itself does not create any advantage or disadvantage for any group or individual, and it is not expected to create disproportionately high or adverse human health or environmental effects on children or on minority or low-income populations or communities at or in the area surrounding Fort Monmouth. Fort Monmouth would address any project-specific issues regarding disproportionate adverse health or environmental effects on children, minority, or low-income groups should they arise and would use best environmental management practices to ensure compliance with applicable regulatory requirements. Therefore, no effects would result from implementation of the no action alternative.

Cumulative Effects. No effects would be expected. A full discussion of cumulative impacts is provided in Section 7.3.

In summary, although the analysis of existing (baseline) conditions identifies no serious environmental concerns, the installation does not currently have a formal, integrated management plan for the conservation or management of its natural resources. This condition conflicts with Fort Monmouth's underlying need to meet mission requirements while simultaneously complying with environmental regulations and policies. In addition, the absence of a formal set of management measures inhibits the installation's ability to adequately incorporate natural resources protection and management in future planning initiatives. Without comprehensive planning, adverse effects on natural resources might occur over the long term. Therefore, implementation of the no action alternative is not favored. Table 7-1 at the end of this section summarizes the anticipated environmental and socioeconomic effects of the no action alternative.

7.2 PROPOSED ACTION (PREFERRED ALTERNATIVE)

Potential consequences associated with the preferred alternative (adoption and implementation of this proposed INRMP) are discussed in this section for each resource area described in Section 3.0, Affected Environment. Section 7.4 summarizes the analysis of potential consequences for the preferred alternative and compares the consequences of the preferred alternative to those of the no action alternative (baseline or existing conditions). Potential environmental consequences associated with implementing the INRMP would result in either no effects or beneficial effects on the resource areas. Compared to the no action alternative, environmental conditions at Fort Monmouth would improve as a result of implementing the preferred alternative. Therefore, implementing the proposed INRMP is the preferred alternative.

Ecoregion and Local Setting. No effects would be expected. The ecoregional and local setting of Fort Monmouth would not be affected by implementation of the INRMP.

Climate. No effects on climate would be expected.

Land Use and Airspace Use. No impacts would be expected. Implementing the INRMP would not result in changes to on-site or surrounding land uses.

Air Quality. No effects would be expected.

Noise. No effects or minor beneficial effects would be expected. Implementation of the preferred alternative would not increase noise sources or levels on Fort Monmouth, but the overall noise environment at the installation could be improved if expanded riparian buffers were to contain shrub and tree layers that would function as natural noise buffers.

Water Quality. Beneficial effects would be expected. Measures to control sedimentation, expand riparian areas, control pollutant runoff to water bodies, control the Canada goose population, and monitor water quality—all of which would be implemented under the preferred alternative—would help to improve water quality in the installation's brooks and ponds.

Topography. No effects would be expected.

Geology. No effects would be expected.

Soils. Minor beneficial effects would be expected. Measures to prevent soil erosion would have beneficial effects on soil retention and productivity.

Petroleum and Minerals. No effects would be expected.

Water Resources. No effects would be expected. The physical presence, size, and extent of surface and ground water resources on the installation would not be affected by implementation of the INRMP.

Infrastructure. No impacts would be expected.

Hazardous and Toxic Materials. No effects would be expected. All hazardous and toxic materials would continue to be handled in accordance with federal laws and Army regulations, including RCRA, FIFRA, TSCA, and AR 200-1.

Upland Habitats. Minor beneficial effects would be expected. Periodic monitoring of the condition of upland forested habitats, encouragement of use and appreciation of the habitats by installation personnel,

and measures to protect biodiversity and habitat quality would have beneficial effects on the ecology of these areas. Maintained grounds would not be expected to be affected by implementation of the preferred alternative.

Wetlands and Riparian Habitats. Beneficial effects would be expected. Implementation of the preferred alternative would increase the quantity of wetland and riparian habitat and interrupt the process of slow deterioration of these resources. Expansion of these habitats along degraded sections of brooks and pond edges would increase their overall viability and value to wildlife.

Flora. Minor beneficial effects would be expected. Implementing the preferred alternative would improve habitats for flora species of wetlands and riparian areas and provide some protection of upland forested habitats from invasive species, which would be beneficial to the native species currently inhabiting them.

Fauna. Minor beneficial effects would be expected. Improvements to upland, wetland, and riparian habitats resulting from implementation of the preferred alternative would be expected to benefit the fauna that inhabit them.

Preserves, Special Habitat, and Significant Natural Areas. No effects would be expected.

Endangered, Threatened, and Rare Species. No effects would be expected. No federally listed endangered, threatened, or rare species are known to occur on Fort Monmouth, so implementation of the proposed INRMP would not be expected to benefit any of these species. However, any improvements in ecological health and biodiversity on the installation as a result of implementation of the preferred alternative could increase the suitability of the installation's natural habitats for establishment of locally occurring endangered or threatened species.

Cultural Resources. No effects would be expected. Implementing the preferred alternative would provide for integration of cultural and natural resources management, but cultural resources would be expected to be adequately protected under the installation's CRMP.

Socioeconomic Resources. No effects would be expected. The primary concern regarding potential effects on socioeconomic resources pertains to changes in population, housing, and economic conditions. Implementation of the preferred alternative would not be expected to affect such conditions.

Environmental Justice. No effects would be expected. The primary concern regarding environmental justice and potential environmental effects pertains to the occurrence of disproportionately high and adverse consequences on children or minority and low-income communities. Implementation of the preferred alternative in itself would not create any advantage or disadvantage for any group or individual. The proposed INRMP is not expected to create disproportionately high or adverse human health or environmental effects on children or on minority or low-income populations or communities at or in the area surrounding Fort Monmouth. Fort Monmouth would address any project-specific issues regarding disproportionate adverse health or environmental effects on children, minority, or low-income groups should they arise and would use best environmental management practices to ensure compliance with applicable regulatory requirements. Therefore, implementing the proposed INRMP would have no effects.

Cumulative Effects. Minor beneficial effects would be expected. A full discussion of cumulative effects is provided in Section 7.3.

The EA findings are consistent with the goals of the natural resources management program to protect and maintain the natural areas of the installation and to manage the grounds of the installation in a manner that supports the military mission and supports and benefits the local ecology. The management measures recommended in the INRMP, if implemented, would directly and positively affect the health and condition of natural resources at Fort Monmouth.

7.3 CUMULATIVE EFFECTS

A cumulative effect is defined as the overall effect on the environment that results from the incremental effect of one action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes the individual actions. Cumulative effects can be significant even if the effects of individual actions are minor.

Implementation of the INRMP would result in a comprehensive natural resources management strategy for Fort Monmouth that represents compliance, restoration, prevention, and conservation; improves the existing management approach for natural resources on the installation; and meets legal and policy requirements consistent with national natural resources management philosophies. Implementation would be expected initially to prevent deterioration in the condition of natural resources at the installation, as shown by the potential for beneficial effects in Table 7-1. Over time, adoption of the preferred alternative would assist Fort Monmouth in achieving its goal of protecting and maintaining the natural areas and ecology of the installation while supporting the military mission.

The INRMP will have little or no effect on the military mission of Fort Monmouth. The primary mission of this installation is to provide command, administrative, and logistical support for CECOM. The support is used in the performance of research, development, procurement, and production of electronic materiel for use by the United States Armed Forces. Mission activities have little impact on the natural resources at Fort Monmouth since they are not integral to accomplishing the primary mission. However, management of existing resources will enhance the living and working conditions of the Fort Monmouth community.

7.4 SUMMARY OF POTENTIAL ENVIRONMENTAL CONSEQUENCES

Table 7-1 summarizes the potential consequences of the no action and preferred alternatives.

Table 7-1
Summary of Potential Environmental Consequences

Resource Area/Environmental Condition[1]	Environmental Consequence	
	No Action	**Proposed Action**
Ecoregion and Local Setting	None	None
Climate	None	None
Land Use and Airspace Use	None	None
Air Quality	None	None
Noise	None	None or Minor Beneficial
Water Quality	None	Beneficial
Topography	None	None
Geology	None	None
Soils	Minor Adverse	Minor Beneficial
Petroleum and Minerals	None	None
Water Resources	None	None
Infrastructure	None	None
Hazardous and Toxic Materials	None	None
Upland Habitats	Minor Adverse	Minor Beneficial
Wetlands and Riparian Habitats	Minor Adverse	Beneficial
Flora	None	Minor Beneficial
Fauna	None	Minor Beneficial
Preserves, Special Habitat, and Significant Natural Areas	None	None
Endangered, Threatened, and Rare Species	None	None
Cultural Resources	None	None
Socioeconomic Resources	None	None
Environmental Justice	None	None
Cumulative Effects[2]	None	Minor Beneficial

[1] Resource areas presented in this column are the same resource areas presented in Section 3.0, Affected Environment.

[2] Cumulative effects (see Section 7.3) have been added to this table for the reader's convenience.

SECTION 8.0: CONCLUSIONS

INRMP Summary. This document reflects the commitment set forth by the Army to protect and maintain the integrity of the natural environment and to manage natural resources with an ecosystem-based approach and in a manner that supports the military mission. The primary purpose and objective of this document is to present an implementable INRMP that guides Fort Monmouth in achieving natural resource management goals and complies with environmental policies and regulations. In addition, the NEPA analysis required for undertaking this major federal action (implementation of this plan) is embodied in the INRMP. This document includes a comprehensive description, evaluation, and assessment of environmental conditions and natural resources at Fort Monmouth.

This INRMP is the plan that will direct the natural resources management program at Fort Monmouth from FY 2000 through FY 2004. An ecosystem approach was used to develop the management measures for each resource area. Implementation of the management measures will protect and maintain the natural resources and habitats of the installation. In addition, the natural resources management measures described in this plan will protect the species and other components of the habitats from unacceptable damage or degradation. The annual funding necessary to fully implement this INRMP is $4,000 to $5,000 in FY 2000 to FY 2003, and $45,000 in FY 2004. The total cost over 5 years of fully implementing this INRMP is $63,000.

Command support is essential for the implementation of this INRMP and is required for many of the natural resources management projects described in the plan. This INRMP has the full support of the Post Commander and other personnel in decision-making positions at Fort Monmouth.

NEPA Findings and Conclusions. The proposed action to implement the INRMP for Fort Monmouth was analyzed by comparing potential environmental consequences against existing conditions. Findings indicate that, under the preferred alternative, potential consequences would result in either no significant adverse effects or a degree of beneficial effects on each resource area (see Section 7.2). The affected environment would not be significantly affected, either beneficially or adversely, by proceeding with the preferred alternative. Furthermore, no significant cumulative effects would be expected.

Based on this EA, implementation of the proposed action would have no significant environmental or socioeconomic effects. Because no significant effects would result from implementation of the proposed action, preparation of an EIS is not required, and preparation of a FNSI is appropriate.

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APPENDIX A

U.S. Fish and Wildlife Service Correspondence

TETRA TECH, INC.
10306 Eaton Pl., Suite 340
Fairfax, VA 22030
Telephone (703) 385-6000

Clifford G. Day, Supervisor
U.S. Fish & Wildlife Service
New Jersey Field Office
927 North Main Street, BLDG. D-1
Pleasantville, NJ 08232-1454

July 19, 1999

Dear Mr. Day:

The Department of the Army is preparing an Integrated Natural Resources Management Plan for Fort Monmouth, New Jersey. Protection of endangered and threatened species will be an integral part of the management of natural resources on the installation under the plan. In accordance with the National Environmental Policy Act, Endangered Species Act, and Fish and Wildlife Coordination Act, an evaluation of the potential environmental impacts (both positive and negative) associated with implementing an Integrated Natural Resources Management Plan on the installation is required.

Previous correspondence from the U.S. Fish and Wildlife Service with respect to base realignment activities, most recently in 1996, has indicated that no federally listed or proposed threatened or endagered flora or fauna under Service jurisdiction are known to occur in the vicinity of the installation, other than the transient bald eagle or peregrine falcon.

Correspondence from the Service in 1994 with respect to base realignment activities indicated that Fort Monmouth is located within the geographic range of the federally listed threatened plant species, swamp pink (*Helonias bullata*). A wetlands delineation was conducted on the installation on both the Main Post and the Charles Wood Subpost in 1998, and no specimens of the species were encountered during the field work. I must note, however, that while those conducting the delineation were paying particular attention to the community structure of the wetlands they were delineating, they were not specifically searching for swamp pink.

I would appreciate it very much if your office would let me know whether there have been any recent changes in status of endangered or threatened species in the vicinity of Fort Monmouth that I should be aware of with respect to preparation of the natural resources management plan.

If you have any questions or require additional information, please call me at (703) 385-6000. The facsimile number in the office is (703) 385-6007, and I can be reached via E-mail at <pettsa@tetratech-ffx.com>. Thank you for your assistance.

Sincerely,

Sam Pett
Project Technical Manager

United States Department of the Interior

FISH AND WILDLIFE SERVICE

ES-99/220

August 27, 1999

Sam Pett, Project Technical Manager
Tetra Tech, Inc.
10306 Eaton Pl., Suite 340
Fairfax, Virginia 22030

Re: Review of federally listed threatened and endangered species in the vicinity of the U.S. Army Fort Monmouth, Monmouth County, New Jersey

Dear Mr. Pett:

This responds to your July 19, 1999 request to the U.S. Fish and Wildlife Service (Service) for information on the presence of federally listed endangered and threatened species within the vicinity of the above referenced project site.

AUTHORITY

This response is provided pursuant to Section 7 of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) to ensure the protection of federally listed endangered and threatened species and does not address all Service concerns for fish and wildlife resources. These comments do not preclude separate review and comments by the Service pursuant to the December 22, 1993 Memorandum of Agreement among the U.S. Environmental Protection Agency, New Jersey Department of Environmental Protection (NJDEP), and the Service, if project implementation requires a permit from the NJDEP pursuant to the New Jersey Freshwater Wetlands Protection Act (N.J.S.A. 13:9B *et seq.*); nor do they preclude comments on any forthcoming environmental documents pursuant to the National Environmental Policy Act of 1969 as amended (83 Stat. 852; 42 U.S.C. 4321 *et seq.*).

CONSULTATION HISTORY

By letter dated January 20, 1994, to the consultant for Fort Monmouth (Eden S. Britt, CH2M Hill, Philadelphia, Pennsylvania), the Service requested that palustrine forested wetlands within Camp Charles Wood and Fort Monmouth be surveyed for swamp pink *(Helonias bullata)*. On April 23, 1995, the Headquarters, U.S. Army Communications - Electronics Command and Garrison Fort Monmouth (Army) forwarded the results of a wetland delineation survey,

including vegetative surveys for federally listed threatened and endangered plants, conducted at Camp Charles Wood to the Service for review. By letter dated May 26, 1995, the Service provided its concurrence with the Army's determination that except for an occasional transient bald eagle (*Haliaeetus leucocephalus*), or peregrine falcon (*Falco peregrinus*), no other federally listed or proposed threatened or endangered flora or fauna were known to occur within the vicinity of Camp Charles Wood, Fort Monmouth at that time. By letter dated December 23, 1997, the Service requested the results of an assessment of habitat suitability or of any surveys conducted for swamp pink at Fort Monmouth proper. To date, the Service has not received this information.

LISTED SPECIES

A known occurrence of swamp pink, a federally listed (threatened) plant species, is found within approximately 4 miles of Fort Monmouth proper (within approximately 2 miles of Camp Charles Wood). Swamp pink is an obligate wetland species that occurs in a variety of palustrine forested wetlands in New Jersey, including forested wetlands bordering meandering streamlets, headwater wetlands, sphagnous Atlantic white cedar (*Chamaecyparis thyoides*) swamps, and spring seepage areas. Specific hydrologic requirements of swamp pink limit its occurrence within these wetlands to areas with lateral ground-water movement that are perennially saturated, but not inundated by floodwaters. Threats to swamp pink include the following: loss of habitat due to wetland filling, clearing and draining; degradation of habitat due to sedimentation from off-site construction activities; flooding and erosion due to increased runoff from upstream sites; and, subtle changes in groundwater and surface water hydrology due to adjacent developments. Additionally, stormwater outfalls discharging into wetlands that support swamp pink can increase the frequency, duration, and volume of flooding in these wetlands and adversely affect swamp pink.

Many areas of New Jersey, including Fort Monmouth, have not been thoroughly surveyed for endangered and threatened plant and animal species. Therefore, occurrences of swamp pink could be located within palustrine forested wetlands on or near the project site. If any such wetlands would be directly or indirectly affected by project activities, the Service requests that a qualified botanist survey the affected wetlands to determine the absence or presence of swamp pink. We request that you forward the results of the survey, including the survey method used and the qualifications of the surveyor, to this office to determine if further consultation pursuant to Section 7(a)(2) of the ESA is necessary.

Pursuant to Section 7, every federal agency, in consultation with the Service, is required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. In accordance with Section 7(a)(2) of the ESA, assessment of potential direct, indirect, and cumulative impacts is required for all federal actions that may affect listed species. If swamp pink is present on or near the property, further consultation pursuant to Section 7 will be necessary. Through the informal consultation process, the Service is available to provide assistance to ensure that the proposed activities will not adversely affect swamp pink.

Enclosed is current information regarding federally listed and candidate species occurring in New Jersey, along with the addresses of State agencies that may be contacted for current site-specific information regarding federal candidate and State-listed species. We have also enclosed information sheets on swamp pink, and the federal endangered species program in New Jersey. Please contact Lisa Arroyo of my staff at (609) 646-9310 if you have any questions or require further assistance regarding federally listed threatened or endangered species.

Sincerely,

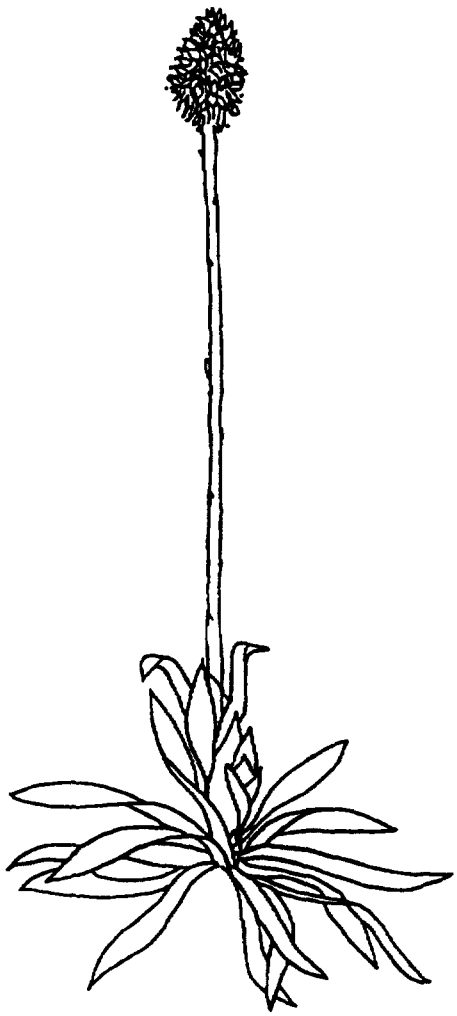
Clifford G. Day
Supervisor

Enclosures

Swamp pink

Swamp pink (*Helonias bullata*) was federally listed as a threatened plant species on September 9, 1988, pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). New Jersey contains the majority of the remaining populations of the species; however, not all of the potential swamp pink habitats in New Jersey have been surveyed. The U.S. Fish and Wildlife Service (Service) requests that a qualified biologist conduct a comprehensive search for swamp pink in any potentially suitable wetland habitat, as described below, that may be impacted by project activities. The following information is provided to assist in identifying the species and its habitat and to describe recommended survey techniques.

IDENTIFICATION: Swamp pink is characterized by a bright pink flower cluster that blooms in early spring. The stocky, hollow flower stem grows from one to three feet tall and has sparse modified leaves along its length. In April or early May, the stem is topped by a cluster (approximately one to three inches long) of pink flowers dotted with pale blue anthers. However, only 10 to 15 percent of the plants in a population typically flower in any one season. When the plant is not flowering, swamp pink can be identified by its smooth, evergreen, lance-shaped leaves (approximately 3 to 10 inches long), which lie almost flat on the ground in a basal rosette. The leaves are shiny green when young and often attain a purplish tint in mature plants. In New Jersey, the plant is easiest to identify when in bloom or in the winter months when few other herbaceous plants are still green. Population sizes may vary from a few to several thousand plants.



HABITAT: Considered an obligate wetland species. swamp pink occurs in a variety of palustrine forested and scrub/shrub wetlands in New Jersey including: forested wetlands bordering meandering streamlets, headwater wetlands, sphagnous Atlantic white cedar swamps, and spring seepage areas. Specific hydrologic requirements of swamp pink limit its occurrence to wetlands that are perennially saturated, but not inundated by floodwater. The water table must be at or near the surface, fluctuating only slightly during spring and summer months.

Swamp pink is a shade-tolerant plant that occurs in wetlands with varying canopy closure. Plant species associated with swamp pink include: Atlantic white cedar (*Chamaecyparis thyoides*), red maple (*Acer rubrum*), pitch pine (*Pinus rigida*), American larch (*Larix lariciana*), black spruce (*Picea mariana*), red spruce (*Picea rubens*), sweet pepperbush (*Clethra alnifolia*), sweetbay magnolia (*Magnolia virginiana*), sphagnum mosses (*Sphagnum* spp.), cinnamon fern (*Osmunda cinnamomea*), skunk cabbage (*Symplocarpus foetidus*), and laurels (*Kalmia* spp.). Swamp pink often grows on hummocks formed by trees, shrubs, and sphagnum mosses, which indicates that these microtopographic conditions may be an important component of swamp pink habitat.

RANGE: Once found inhabiting wetland areas from New York to Georgia, swamp pink now occurs only along the coastal plain from New Jersey to Virginia and in small isolated bog areas in the Southern Appalachian Mountains. Containing more than 70 percent of the known sites, New Jersey represents the global stronghold for swamp pink. Plant colonies are found in Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Middlesex, Monmouth, Morris, Ocean, and Salem Counties.

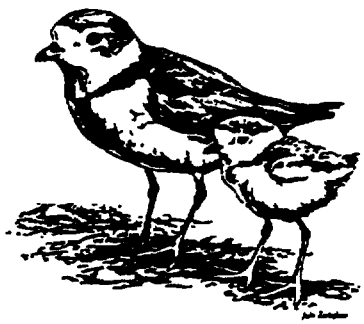
THREATS: Threats to swamp pink include: loss or degradation of habitat due to illegal filling of wetlands; sedimentation from off-site construction activities; introduction of excess nutrients or toxic chemicals (e.g., herbicides) into the water; and, changes in groundwater and surface water hydrology due to excavation, water withdrawal, and increased runoff from upstream development (causing flooding and erosion). Additionally, direct discharge from stormwater outfalls can increase the frequency, duration, and volume of flooding in swamp pink wetlands and adversely affect the species.

SURVEY REQUIREMENTS: Although surveys can be conducted year round, the Service recommends conducting surveys from late fall to early spring when the foliage of other plant species is reduced, making the evergreen foliage of swamp pink easier to detect. Random transect surveys are inappropriate since the species may be present in small wet pockets, which may be overlooked during the random transect method. All available suitable habitat within the project impact area should be surveyed, concentrating on forested wetland areas as previously described, with suitable hydrology. The surveyor should census not only the wetlands on the subject property, but also upstream and downstream wetlands. Please **do not** collect specimens or send plants or parts of plants to the Service for identification. Report the survey method used, the qualifications of the surveyor, and the results of the survey (including size of area surveyed, hours searched, aerial and/or ground photographs with index map, and wetland delineations) to:

U S. Fish and Wildlife Service
New Jersey Field Office
927 North Main Street, Building D-1
Pleasantville, New Jersey 08232
Telephone: (609) 646-9310
Facsimile: (609) 646-0352

CONSERVATION AND PROTECTION: The Service's Swamp Pink Recovery Plan identifies permanent protection of at least 80 large populations. If you own property containing swamp pink or know of other landowners who would be interested in permanently protecting this species, please notify the Service for additional information and assistance.

THE FEDERAL ENDANGERED SPECIES PROGRAM IN NEW JERSEY



For further information, please contact:

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Ecological Services
New Jersey Field Office
927 North Main Street, Building D-1
Pleasantville, New Jersey 08232
(609)646-9310
FAX (609)646-0352

ENDANGERED SPECIES ACT: A BRIEF OVERVIEW

Congress passed the Endangered Species Act (ESA) in 1973. The ESA is the most comprehensive law ever enacted by a Nation for the preservation of endangered species and states that endangered and threatened animals and plants "are of aesthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people."

HOW DOES THE ENDANGERED SPECIES ACT WORK IN NEW JERSEY?

Simply stated, the ESA works in New Jersey through local actions to protect and restore one of the State's most precious resources: its native wildlife and plants. Endangered species biologists in the U.S. Fish and Wildlife Service's (Service) New Jersey Field Office protect and restore populations of species included on the Federal List of Endangered and Threatened Wildlife and Plants and their habitats by: monitoring species that are candidates for listing; implementing protection strategies for candidate species (which in some cases may avoid the need for listing); adding species that are in need of protection; working to recover and restore listed species; and consulting with other federal agencies regarding activities that may affect listed species. In addition, the New Jersey Field Office serves as a contact point to distribute information about the ESA and federally listed species in New Jersey.

New Jersey, while one of the Nation's most densely populated States, provides habitat for the following federally listed species for which the Service is responsible: bald eagle (*Haliaeetus leucocephalus*); peregrine falcon (*Falco peregrinus*); piping plover (*Charadrius melodus*); Indiana bat (*Myotis sodalis*); northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*); dwarf wedgemussel (*Alasmidonta heterodon*); small whorled pogonia (*Isotria medeoloides*); swamp pink (*Helonias bullata*); Knieskern's beaked-rush (*Rhynchospora knieskernii*); American chaffseed (*Schwalbea americana*); bog turtle (*Clemmys muhlenbergii*); and sensitive joint-vetch (*Aeschynomene virginica*). Additionally, New Jersey has a species under consideration as a candidate for listing under the ESA, bog asphodel (*Narthecium americanum*). New Jersey is especially important for the conservation of bog asphodel and Knieskern's beaked-rush, species no longer found anywhere else in the world. Moreover, New Jersey represents the global stronghold for swamp pink, harboring more than 70 percent of the world's population of this species.

WHY CARE ABOUT ENDANGERED SPECIES CONSERVATION?

Why should New Jerseyans protect the State's diversity of native animals and plants? Because a healthy environment provides for a healthy human population, which in turn sustains a healthy economy. Imagine for a moment, the impact of a polluted Jersey shore on the State's economy. According to the *Coastal Alliance*, revenues generated from the New Jersey coastline represent 51 percent of the State's total economy. The annual dollars spent in coastal communities in New Jersey alone is 79.6 billion.

Perhaps even more important than economic value is each living organism's unique reservoir of genetic material. This genetic material cannot be retrieved or duplicated if lost and may hold unknown economic benefits for humankind in medicine, agriculture, and industry. In addition, these organisms generate the air we breathe, clean the water we drink, and recycle nutrients in the soil to help grow the plants we eat.

HOW DOES THE ENDANGERED SPECIES ACT AFFECT DEVELOPMENT PROJECTS IN NEW JERSEY?

There is little truth to the belief that maintaining a healthy environment and protecting declining species populations will stop development and result in large-scale loss of jobs in New Jersey (or in the United States for that matter). One need not be a scientist to know that humans do not want to live or work in an area that is contaminated or lacks cultural, historical, and aesthetic beauty. Section 7 of the ESA helps protect listed species by requiring federal agencies to consult with the Service or National Marine Fisheries Service on federally funded or permitted projects where these species are present. Private individuals applying for federal permits may also become involved in this coordination process. Section 7 consultations in New Jersey have been extremely effective in assisting federal agencies in project planning while maintaining the survival of listed species. For example, from 1990 through 1994, the Service's New Jersey Field Office conducted 831 Section 7 consultations. Through the planning efforts involved with those consultations, projects were modified to be more environmentally acceptable, but not one project was stopped. Nationwide, from 1988 through 1994, the Service conducted more than 120,000 Section 7 consultations with federal agencies. Of those consultations, only 18, less than one-tenth of one percent of the total, did not go forward as planned.

THE ENDANGERED SPECIES ACT: A NEW JERSEY SUCCESS STORY

The following success stories are provided to illustrate how the ESA is working for the people of New Jersey.

B.T. Nautilus Piping Plover Restoration Plan. In June 1990, the oil tanker "B.T. Nautilus" grounded in the Kill Van Kull waterway of New Jersey and New York, resulting in the discharge of approximately 267,000 gallons of fuel oil into the Kill Van Kull and adjacent waterways. Damages from the spill outside of the New York / New Jersey Harbor Estuary area primarily included lost recreational use of beaches and injuries to federally threatened piping plovers, which were nesting on Atlantic coastal beaches at the time of the spill. A settlement was reached providing payment of $3.3 million in compensation for natural resource injuries, including $679,000 for piping plover recovery activities in New Jersey to be distributed over a five-year period. A cooperative effort among the State of New Jersey, the Service, the National Park Service, and The Nature Conservancy resulted in the development of a restoration plan for the piping plover to compensate for losses to the piping plover population in New Jersey from the oil spill. In addition, a Memorandum of Understanding will be developed with coastal municipalities to promote beach management compatible with nesting plovers.

Northeastern beach tiger beetle. The Service has recently initiated recovery activities that may restore this federally threatened insect to portions of its former range. The northeastern beach tiger beetle, historically found in "great swarms" along New Jersey's undeveloped Atlantic coastal beaches, disappeared from the State by the 1970s. In October 1994, an experimental reintroduction technique using northeastern beach tiger beetle larvae was field-tested at the Gateway National Recreation Area, Sandy Hook Unit. The results of this experimental effort will assist biologists in developing a technique to safely transport and relocate beetle larvae in order to reintroduce the species to locations within its historic range. In addition, biologists accommodated the biological needs of the species without affecting the public's recreational beach use.

Swamp Pink. In August 1995, the New Jersey Field Office concluded informal consultation with the U.S. Environmental Protection Agency (EPA) regarding the planned clean up of groundwater contaminated by the Gloucester Environmental Management Services, Inc. (GEMS) Superfund site in Camden County, New Jersey. The EPA's original clean up design had the potential to drain several adjacent wetland areas supporting more than 25,000 clumps of federally threatened swamp pink plants. Working with the Service, the EPA modified the project by reducing the number of groundwater extraction wells to avoid draining wetlands supporting swamp pink, while still allowing for capture of the contaminant plume from the GEMS Landfill.

WHAT CAN YOU DO TO HELP CONSERVE ENDANGERED AND THREATENED SPECIES IN NEW JERSEY?

Interested individuals and organizations can assist in the conservation of rare species by supporting enforcement of wetland protection laws, reducing the use of household chemicals (including pesticides and lawn fertilizers), supporting open space preservation, reducing waste, and recycling. Additionally, concerned citizens can join conservation organizations that support their local National Wildlife Refuges. But the greatest contribution one can make is to respect all life forms and work to conserve those life forms for others to enjoy.

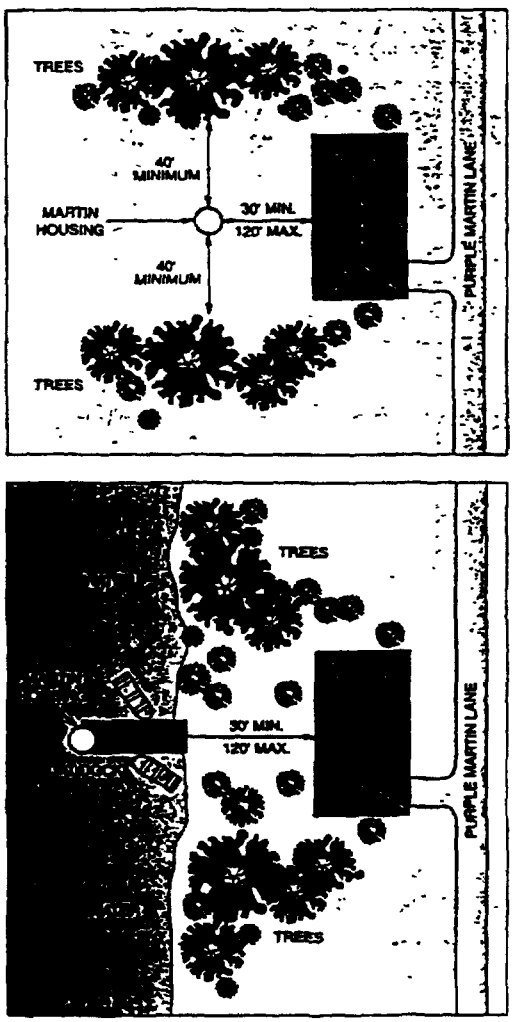
February 1996

The *PMCA*'s Best Martin Management Tips

James R. Hill, III & Louise Chambers
Purple Martin Conservation Association
Edinboro University of Pennsylvania
Edinboro, PA 16444

Educate yourself first. Don't make the mistake of buying or building a martin house before thoroughly researching the subject. You may find out after investing money, time, and hard work, that your yard is too tree enclosed for martins, or your martin house is difficult or impossible to manage. There are many sources of information available. Visit *www.purplemartin.org*, the *PMCA*'s web site, talk with other landlords, and read *"Enjoying Purple Martins More"* and/or *Stokes' Purple Martin Book*. *PMCA* members can benefit from all the current information published in the colorful *Purple Martin Update* magazine

Choose the right location. (See diagrams, right.) One of the major reasons people fail to attract martins is that they place the martin housing incorrectly. Martins have very specific space requirements. Their housing should be in the center of the largest open spot available, about 30-120 feet from human housing. Place the housing where you can see it so you can enjoy watching and hearing the martins. There should be no trees within 40 feet, preferably 60 feet. In the southern half of their breeding range, martins are less fussy about house placement, so sometimes housing can be within 25 feet of trees and still attract martins. But the farther housing is placed from trees, the better. Housing height should be about 10-15 feet. Don't attach wires to the house or pole, especially if they lead to trees, buildings, or the ground. Predators can use the wires to access the housing.



The recommended placement of martin housing in different types of yard habitat.

Put up manageable housing. Your chances for success will be better if your housing is easy to manage. Choose a pole that telescopes, or is equipped with a winch or lanyard, and housing that has easy access to compartments. Avoid housing that only allows access by removing the roof, or layers of the house, or through entrance holes. Paint houses and gourds white, or a light color. White housing attract martins best, and reflects sunlight, keeping nestlings cooler.

Compartment floor dimensions should be at least 6" x 6," but larger compartments (7" x 12") are preferred by the martins, and offer better protection from predators and rain. Larger compartments are also attractive to European Starlings, but a special entrance hole (see opposite page) will minimize starling problems. Height of compartments can be 6" or 7." Place entrance holes 1" above the floor. An entrance hole of 2&1/8" is preferred by the martins, but they will use a range from 1&7/8" to 2&1/4." Make sure there is adequate ventilation and drainage in each compartment. Many plans for martin housing, and some manufactured houses, are made to incorrect dimensions, so if your housing is unsuccessful, check the dimensions and modify where necessary. Most houses can be improved. Add insulation to the attic, remodel interiors to offer double-size compartments, and add porch dividers. Dividers help keep males from claiming extra compartments, and can double occupancy rates. They also keep nestlings from wandering to other compartments, where they can get lost and die, or steal food from younger nestlings, causing them to starve.

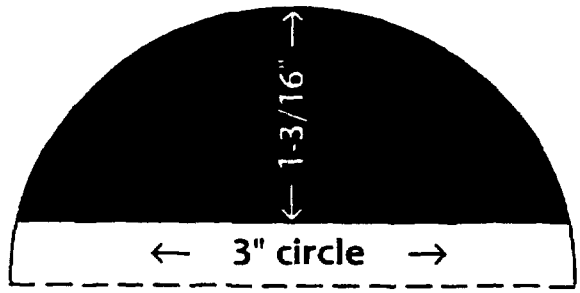
Protect your housing from predators. Don't assume that because you never see any predators there are none around. Raccoons, snakes, and owls raid bird houses at night. Few experiences are more painful than losing all your martins because you didn't equip your poles and housing with guards. Whether your housing consists of 6" x 6" or 7" x 12" compartments, external guards to protect against owls, hawks, and crows are insurance every house needs. Since all martin poles, wood or metal, are easily climbed by rat snakes, squirrels, and raccoons, all birdhouse poles require climbing animal barriers. You can install guards before or after your martins have arrived. In areas with fire ants, Teflon spray or tape, or a ring of grease on the pole, will stop the ants. Grease won't stop snakes or raccoons, so install a pole guard, too.

Open housing at the right time, and don't close it too soon. Adult martins are rarely attracted to new breeding sites — they return to the sites where they bred previously. Typically, it is subadult martins (last year's young) that colonize new sites, and they begin arriving about 4 weeks after the first adults. At new sites, opening housing when the "scouts" are due decreases chances of attracting martins by giving House Sparrows and starlings 4 weeks to claim the site before the subadult martins arrive. To improve your chances, keep housing closed until it's time for subadults to arrive (refer to the range map

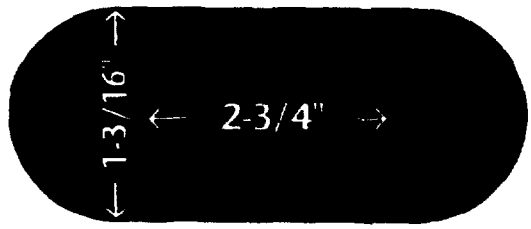
on page 7.) At active sites, the first martins usually show up within a week or two of previous years' arrival dates. Have your housing ready, but keep it closed until some martins return. Migration is a drawn-out affair, with martins arriving for 8-12 weeks in the north, 16-20 weeks in the south. Martins can arrive and begin nesting up through the end of June, so keep your housing ready; don't close it up, or let other birds use it.

Practice active management by controlling House Sparrows and European Starlings. Starlings and House Sparrows will take over compartments, destroy eggs, kill nestlings, and prevent martins from nesting at unestablished sites. Adult martins are often injured or killed by starlings. Successful martin landlords do not tolerate these nonnative nest-site competitors. Starlings and House Sparrows are not protected (since they are not native birds) and may be controlled by trapping, shooting, and nest tear-outs. You can also use the starling-resistant entrances pictured here. If native birds (Tree Swallows, wrens, bluebirds, or flycatchers) try to nest in your martin housing, close it and put up single-unit boxes for these desirable species elsewhere on your property. Reopen the martin housing only after the new box has been accepted.

A Starling-resistant Entrance Hole



These diagrams show how to cut a starling-resistant entrance hole for your martin housing. The height dimension is extremely critical. If made a hair too big, starlings will get in; if made a hair too small, martins won't be able to. Cut the crescent-shaped entrance hole with a *forstner drill* bit and a *jigsaw*. If cutting the crescent hole seems too difficult, try the oval slot shown below, which is cut with a 1&3/16" forstner bit, or cut a rectangular hole with the same dimensions. All have been successful at excluding starlings, while still permitting Purple Martins to enter. Also, placement is important. The bottom of the entrance hole may be placed flush with the porch floor, or 1/4" to 1/2" above the porch, but should not be any higher.



Conduct weekly nest checks, daily walk-unders, and keep written records. Although many landlords are reluctant to lower their housing during the breeding season to peek in on their tenants, it's one of the most valuable practices landlords can adopt. Nest checks will not cause martins to abandon their young. If your martin housing raises and lowers vertically, as it should, number the compartments, check nests weekly, and keep written records. Landlords who conduct regular nest checks will be more successful, simply because they'll discover any problems that occur in time to correct them. In addition to weekly checks, walk under the housing daily to look for plucked martin feathers, thrown-out nestlings, dropped insect prey, hatched eggshells, etc. The items you find are clues to what's going on and may alert you to problems that need attention.

Keep your martin housing in good repair. Remove nests and scrub housing with a 10% bleach solution (1 part bleach to 9 parts water) in the fall. Rinse and air dry before storing or closing for the winter. Take care of any needed repairs now, so you won't be caught unprepared next spring. Wooden houses and natural gourds need to be sanded and repainted periodically. All types of housing will last longer if stored indoors over the winter. If housing is left out, plug the holes, otherwise House Sparrows and starlings will claim it in late winter and be impossible to dislodge come spring.

Be prepared for problems: Keep the phone number of a licensed wildlife rehabilitator handy; a rehabber is a sick or injured bird's best chance for survival. Place fallouts back in the nest; if that's not possible, take them to a rehabber. Don't try to raise them yourself; it's illegal and your good intentions cannot replace the experience and skills of a rehab specialist. If parasites or wet nests threaten the survival of nestlings, replace the nest material with clean, dry wood shavings. Parasite numbers can also be reduced by placing freshwater DE (diatomaceous earth) in compartments. Never use pesticides in nest boxes; it's illegal and they are not safe for wild birds and nestlings.

Supply these aids: Crushed, dried eggshell or oystershell is a valuable dietary supplement that supplies calcium and grit, and helps prevent calcium deficiencies in nestlings. Offer it all season in an open feeder. Eggshells should be rinsed, dried thoroughly in the sun or a 350 degree oven, then crushed into small pieces. Landlords can also put nest material out for their birds. Dried pine needles, dry twigs, or a bale of straw scattered in an open area will be used by the martins. Create a supply of mud for them by soaking an area of ground with a hose.

Work with other martin enthusiasts in your community. Martin landlords are a very friendly bunch of people, so don't be shy. Stop and introduce yourself to other landlords, and make some new friends. Ask the local newspaper to do a story on martins, and have meetings to share information. Consider hosting an "open house" at your colony site for those interested in martins. By promoting good management and participation in *PMCA* research projects, you can help increase martin numbers locally. And, if you can help area landlords become better educated and more involved in management, you'll assure a better supply of fledglings each season to help martin populations thrive again.

RARITAN BAY WILDLIFE HABITAT REPORT

with Recommendations for Conservation

Richard Kane and Paul Kerlinger
New Jersey Audubon Society
Department of Conservation
P.O. Box 693
Bernardsville, NJ 07924

December 1994

Photos by Art Panzer

NEW JERSEY AUDUBON SOCIETY

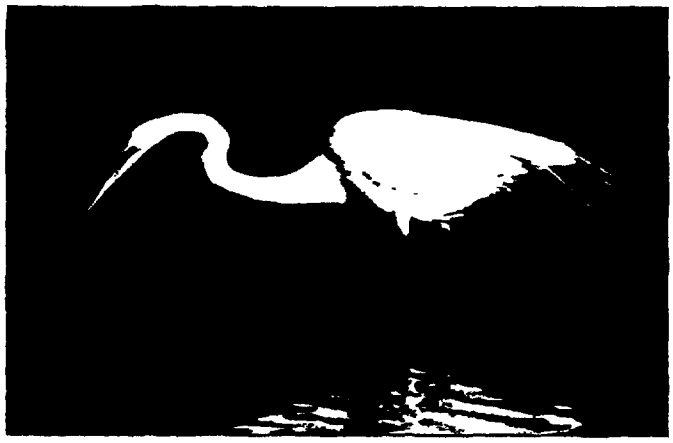
hawk migration counts conducted by NJAS/CMBO since 1979 serve as one of the best long-term data bases for migrating hawks in the eastern United States. It will be included in any long-term monitoring plan for waterfowl and songbirds. Because Sandy Hook is part of the United States Park Service's Gateway National Recreation Area, it is protected, but some habitats within the recreation area are under pressure from competing uses. Beach-nesting Black Skimmers (E), terns, and Piping Plover (E) require fencing and monitoring by wardens. Other areas are under threat of becoming parking lots. The thicket and grass field at Area K should be maintained. Parking lots should not be permitted on the bay side because habitat there is too fragile and valuable.

■ Confluence

(Navesink-Shrewsbury rivers)

This site has been known for Northern Harrier (E), and also harbors large concentrations of waterfowl, especially "huge concentrations of Greater Scaup" on occasion during winter (Scott Barnes, pers. comm.). One reason for the concentrations is that the area is ice-free during much of the winter or it is the last place to "ice-up" during the coldest months. Small islands in the confluence of the Shrewsbury and Navesink rivers have plants such as *Ailanthus* and high tide bush. The islands and the surrounding waters host Least and Common terns during summer months. This site stretches from Ocean Drive to Oceanic Bridge and Claypit Creek. Upstream of Ocean Bridge on the Navesink River at the mouth of McCless Creek there are reported concentrations of waterfowl and herons in the salt marsh along the creek, and in the woods, migrant passerines such as Winter Wren and Yellow-bellied Sapsucker occur (Scott Barnes, pers. comm.). Adjacent to the Confluence site, there are concentrations of herons, waterfowl, especially American Wigeon (Scott Barnes, pers. comm.). The dispersion of these waterfowl concentrations in this drainage is tidally dependent. The survey showed major use of the site by Brant, Greater Scaup, American Black Duck, American Wigeon, Canvasback, Bufflehead, Ruddy Duck, and Red-breasted Merganser.

Conservation: The Confluence was selected as one of several long-term monitoring sites for waterfowl and waterbirds. Count locales should include: (i) Beach Way, (ii) Two Rivers Marina, and (iii) the parking area at the north end of the bridge looking at the mouth of Clay Pit Creek. The entire area is considered one site, as the birds move around, depending on wind and tide. The wetlands have been protected by legislation and by adjacent Monmouth County park land and federal military property. Maintenance of water quality is essential for the large concentrations of waterbirds and fish.



Egrets are frequent summer visitors to the bay creeks and marshes where they feed on small fish. Great Egrets are especially regular at the islands in the confluence of the Shrewsbury-Navesink Rivers.

■ Wagner Creek

This site includes the old pilings at the Catamaran Club. The site extends from the jetty at the yacht club to Wagner Creek. There is some open space consisting of some open sandy beach, and two small creek mouths, Many Mind and Wagner creek. Most of the bird feeding activity occurs on flats at the mouth of Many Mind

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
927 North Main Street (Bldg. D1)
Pleasantville, New Jersey 08232

Tel: 609-646-9310
FAX: 609-646-0352

IN REPLY REFER TO

ES-96/21

February 12, 1996

Ms. Susan Bartow
Tetra Tech, Incorporated
10306 Eaton Plaza
Suite 340
Fairfax, Virginia 22030

Re: Proposed Addition of 175 Military Personnel to the Main Post, Fort Monmouth, Monmouth County, New Jersey

Dear Ms. Bartow:

This is in response to your January 29, 1996 telephone conversation with Thomas McDowell of my staff. The conversation between you and Thomas McDowell clarified that 175 military personnel would be placed at the Main Post, Fort Monmouth and not the Charles Wood Subpost, Fort Monmouth as our January 22, 1996 letter stated.

The U.S. Fish and Wildlife Service (Service) has reviewed the above-referenced proposed project pursuant to Section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*). Except for an occasional transient bald eagle (*Haliaeetus leucocephalus*) or peregrine falcon (*Falco peregrinus*), no other federally listed or proposed threatened or endangered flora or fauna under Service jurisdiction are known to occur in the vicinity of the proposed project site. Therefore, no further consultation pursuant to Section 7 of the Endangered Species Act is required by the Service. If additional information on federally listed threatened or endangered species becomes available, this determination may be reconsidered.

These comments pertain to federally listed species only and do not preclude separate review and comment by the Service as afforded by the Fish and Wildlife Coordination Act (48 Stat. 401, 16 U.S.C. 661 *et seq.*), if any federal permits or licenses are required for the proposed project nor do they preclude comment on any forthcoming environmental documents pursuant to the National Environmental Policy Act (83 Stat. 852; 42 U.S.C. 4321 *et.seq.*).

Enclosed are current summaries of the federally listed and candidate species in New Jersey. The addresses of State agencies to contact for site-specific candidate and State-listed species information in New Jersey are also enclosed for your consideration in project planning.

Please contact Thomas McDowell of my staff if you have any questions or require further assistance regarding federally listed threatened or endangered species. The Service apologizes for the delay in responding to your request for information. The delay was due to the recent three-week partial federal government shutdown.

Sincerely,

John C. Staples
Assistant Supervisor

Enclosures

APPENDIX B

State of New Jersey Correspondence

TETRA TECH, INC.
10306 Eaton Pl , Suite 340
Fairfax, VA 22030
Telephone (703) 385-6000

Office of Natural Lands Management
Natural Heritage Program
P.O. Box 404
22 South Clinton Ave
Trenton NJ 08625-0404

June 10. 1999

Dear Natural Heritage:

Tetra Tech. Inc. is contracted to the U.S. Army, Army Materiel Command, to conduct surveys of threatened and endangered species, flora, and fauna on Fort Monmouth, New Jersey. A list for Monmouth County. New Jersey, obtained from your Internet site indicates that 56 Federal- and State-listed species have been identified as occurring in the county. Fort Monmouth is only 1.138 acres, and it is mostly developed land, so I suspect that many of those 56 species would not be expected to occur on the installation. I would appreciate it if you could provide a list of species known to occur or reasonably likely to occur within the boundaries of the installation and in its immediate surroundings.

I have indicated the location of the installation on the USGS map enclosed (Long Branch quadrangle). I have also included a completed data request form. The information obtained will help Tetra Tech. Inc. to further define the scopes of the surveys to be performed and the reports generated will assist the Army in its efforts to manage its lands responsibly for the conservation of threatened and endangered species and biodiversity.

Thank you for your assistance and I look forward to your reply.

Sincerely.

Sam Pett
Tetra Tech. Inc.
10306 Eaton Place
Suite 340
Fairfax VA 22030

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection

Robert C Shinn, Jr
Commissioner

Division of Parks and Forestry
Office of Natural Lands Management
Natural Heritage Program
P.O Box 404
Trenton, NJ 08625-0404
Tel. #609-984-1339
Fax. #609-984-1427

June 25, 1999

Sam Pett
Tetra Tech, Inc.
10306 Eaton Place, Suite 340
Fairfax, VA 22030

Re: Fort Monmouth Natural Resource Management Plan

Dear Mr. Pett:

Thank you for your data request regarding rare species information for the above referenced project site in Tinton Falls, Eatontown and Oceanport Boroughs, Monmouth County.

The Natural Heritage Data Base does not have any records for rare plants, animals, or natural communities on the site. Attached is a list of rare species and natural communities that have been documented from Monmouth County. This county list(s) can be used as a master species list for directing further inventory work. If suitable habitat is present at the project site, these species have potential to be present. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend you contact the Division of Fish, Game and Wildlife, Endangered and Nongame Species Program.

PLEASE SEE THE ATTACHED 'CAUTIONS AND RESTRICTIONS ON NHP DATA'.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Thomas F. Breden
Supervisor

cc Lawrence Niles
Thomas Hampton
NHP File No 99-4007338

1

07 APR 1999

MONMOUTH COUNTY

RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN

THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
*** Vertebrates						
ACCIPITER COOPERII	COOPER'S HAWK		E		G5	S1B,S1N
AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW	(PS)	T/T		G5	S2B
BARTRAMIA LONGICAUDA	UPLAND SANDPIPER		E		G5	S1B
CHARADRIUS MELODUS	PIPING PLOVER	(LE,LE)	E		G3	S1B
CLEMMYS INSCULPTA	WOOD TURTLE		E		G4	S3
CLEMMYS MUHLENBERGII	BOG TURTLE	(LT,T(S/A))	E		G3	S2
CROTALUS HORRIDUS HORRIDUS	TIMBER RATTLESNAKE		E		G4T4	S2
DOLICHONYX ORYZIVORUS	BOBOLINK		T/T		G5	S2B
HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	(PS)	E		G4	S1B,S2N
HYLA ANDERSONII	PINE BARRENS TREEFROG		E		G4	S3
MELANERPES ERYTHROCEPHALUS	RED HEADED WOODPECKER		T/T		G5	S2B,S2N
NYCTANASSA VIOLACEA	YELLOW CROWNED NIGHT HERON		T/T		G5	S2B
PANDION HALIAETUS	OSPREY		T/T		G5	S2B
PASSERCULUS SANDWICHENSIS	SAVANNAH SPARROW		T/T		G5	S2B,S1N
PITUOPHIS MELANOLEUCUS MELANOLEUCUS	NORTHERN PINE SNAKE		T		G5T4	S3
PODILYMBUS PODICEPS	PIED BILLED GREBE		E/S		G5	S1B,S1N
POOECETES GRAMINEUS	VESPER SPARROW		E		G5	S1B,S2N
RYNCHOPS NIGER	BLACK SKIMMER		E		G5	S1B
STERNA ANTILLARUM	LEAST TERN	(PS)	E		G4	S1B
STRIX VARIA	BARRED OWL		T/T		G5	S3B
*** Ecosystems						
COASTAL DUNE WOODLAND	COASTAL DUNE WOODLAND				G2G3	S1
FLOODPLAIN FOREST	FLOODPLAIN FOREST				G1	S4
MARITIME FOREST	MARITIME FOREST				G3?	S1
*** Invertebrates						
APAMEA APAMIFORMIS	A NOCTUID MOTH				G4	S2S4

MONMOUTH COUNTY

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NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
CHYTONIX SENSILIS	A NOCTUID MOTH				G4	S1S3
CICINDELA DORSALIS DORSALIS	NORTHEASTERN BEACH TIGER BEETLE	LT	E		G4T2	S1
EUALIA MA RECURVATUM	PINE BARRENS BLUET				G3	S3
EUPATALIA HENRICI	HENRY'S ELFIN				G5	S3S4
INCISALIA IRUS	FROSTED ELFIN				G3G4	S2S3
LIBELLULA AUPILENNIS	GOLDEN WINGED SKIMMER				G5	S1S2
METARRANTHIS PILOSARIA	COASTAL SWAMP METARRANTHIS				G3G4	S1S4
NEONYMPHA AREOLATA SEPTENTRIONALIS	A SATYR				G5T3T4	S3
PAPAIPEMA NEBRIS	SUNFLOWER BORER MOTH				G4?	SH
PYGARCTIA ABDOMINALIS	YELLOW EDGED PYGARCTIA				G3G4	SH
SPEYERIA IDALIA	REGAL FRITILLARY				G3	SX
ZALE CUREMA	A NOCTUID MOTH				G3G4	SU

*** Other types

MIGRATORY SHOREBIRD CONCENTRATION SITE	MIGRATORY SHOREBIRD CONCENTRATION SITE				G?	S?

*** Vascular plants

AGASTACHE NEPETOIDES	YELLOW GIANT HYSSOP				G5	S2
AMARANTHUS PUMILUS	SEA BEACH PIGWEED	LT	E		G2	SH
ARTEMISIA CAMPESTRIS SSP CAUDATA	WILD WORMWOOD				G5T5	S?
ASCLEPIAS RUBRA	RED MILKWEED			LP	G4G5	S2
ASCLEPIAS VARIEGATA	WHITE MILKWEED				G5	S2
ASTER INFIRMUS	CORNEL LEAVED ASTER				G5	S2
ASTER RADULA	LOW ROUGH ASTER		E		G5	S1
CACALIA ATRIPLICIFOLIA	PALE INDIAN PLANTAIN		E		G4G5	S1
CALAMAGROSTIS PICKERINGII	PICKERING'S REEDGRASS		E		G4	S1

MONMOUTH COUNTY

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NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
CALAMOVILFA BREVIPILIS	PINE BARREN REEDGRASS			LP	G4	S4
CAREX BARRATTII	BARRATT'S SEDGE			LP	G4G5	S1
CAREX CUMULATA	CLUSTERED SEDGE		E		G4?	SH
CAREX POLYMORPHA	VARIABLE SEDGE		E		G2G3	S1
CERATOPHYLLUM ECHINATUM	SPINY COONTAIL		E		G5	S1
CRATAEGUS CALPODENDRON	PEAR HAWTHORN		E		G5	S1
CRATAEGUS SUCCULENTA	FLESHY HAWTHORN		E		G5	S1
CYPERUS LANCASTRIENSIS	*LANCASTER FLATSEDGE*				G5	S1
CYPERUS POLYSTACHYOS	COAST FLATSEDGE		E		G5	S1
DESMODIUM HUMIFUSUM	TRAILING TICK TREFOIL		E		G1G2Q	SH
DIODIA VIRGINIANA	LARGER BUTTONWEED		E		G5	S1
DIRCA PALUSTRIS	LEATHERWOOD				G4	S2
ERIOCAULON PARKERI	PARKER'S PIPEWORT				G3	S2
FRAXINUS PROFUNDA	PUMPKIN ASH		E		G4	S1
GENTIANA AUTUMNALIS	PINE BARREN GENTIAN			LP	G3	S3
GLAUX MARITIMA	SEA BEACH MILKWORT		E		G5	SH
HELONIAS BULLATA	*SWAMP PINK*	LT	E	LP	G3	S3
HYDROCOTYLE VERTICILLATA	WHORLED PENNYWORT				G5	S2
JUNCUS CAESARIENSIS	NEW JERSEY RUSH		E	LP	G2	S2
LIATRIS SCARIOSA VAR NOVAE-ANGLIAE	NORTHERN BLAZING STAR		F		G5T3	SH
LIMOSELLA SUBULATA	MUDWEED		E		G1?	S1
LINUM INTERCURSUM	SANDPLAIN FLAX		E		G4	S1
LISTERA AUSTRALIS	*SOUTHERN TWAYBLADE*			LP	G4	S?
LUZULA ACUMINATA	HAIRY WOODRUSH		E		G5	S1
LYGODIUM PALMATUM	CLIMBING FERN			LP	G4	S2
MYRIOPHYLLUM TENELLUM	SLENDER WATER MILFOIL		F		G5	S1
ONOSMODIUM VIRGINIANUM	VIRGINIA FALSE GROMWELL		F		G4	S1
PHORADENDRON SEROTINUM	MISTLETOE			LP	G5	S2
PLANTAGO MARITIMA	SEA SIDE PLANTAIN				G5	S2

MONMOUTH COUNTY

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NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
PLANTAGO PUSILLA	SLENDER PLANTAIN		E		G5	SH
PLATANTHERA PERAMOENA	PURPLE FRINGELESS ORCHID		E		G5	S1
POLYGONUM GLAUCUM	SEA BEACH KNOTWEED		E		G1	S1
LYCOPODIUM COPPERI	COPPER'S MOUNTAIN MOSS		E		G2	S1
PYROLA CHLORANTHA	GREENISH FLOWERED WINTERGREEN		E		G5	S1
RANUNCULUS CYMBALARIA	SEA SIDE CROWFOOT		E		G5	SH
RHYNCHOSPORA GLOBULARIS	GRASS LIKE BEAKED RUSH		E		G5	S1
RHYNCHOSPORA KNIESKERNII	KNIESKERN'S BEAKED RUSH	LT	E	LP	G1	S1
RHYNCHOSPORA PALLIDA	PALE BEAK RUSH				G3	S3
RUMEX HASTATULUS	HEART-WINGED SORRELL				G5	SX 1
SAGITTARIA AUSTRALIS	*SOUTHERN ARROW HEAD*		E		G5	S1
SALIX LUCIDA	SHINING WILLOW				G5	S2
SCIRPUS MARITIMUS	SALT MARSH BULRUSH		E		G5	SH
SCLERIA MINOR	SLENDER NUT RUSH			LP	G4	S4
TRIGLOCHIN MARITIMUM	SEA SIDE ARROW GRASS		E		G5	S1
UVULARIA PUBERULA VAR NITIDA	PINE BARREN BELLWORT		E		G5T3?	S2
VERBENA SIMPLEX	NARROW-LEAVED VERVAIN		E		G5	S1

Records Processed

EXPLANATIONS OF CODES USED IN NATURAL HERITAGE REPORTS

FEDERAL STATUS CODES

The following U S Fish and Wildlife Service categories and their definitions of endangered and threatened plants and animals have been modified from the U S Fish and Wildlife Service (F R Vol 50 No 188, Vol 61 No 40 F R 50 CFR Part 17) Federal Status codes reported for species follow the most recent listing

LE Taxa formally listed as endangered

LT Taxa formally listed as threatened

PE Taxa already proposed to be formally listed as endangered

PT Taxa already proposed to be formally listed as threatened

C Taxa for which the Service currently has on file sufficient information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species

S/A Similarity of appearance species

STATE STATUS CODES

Two animal lists provide state status codes after the Endangered and Nongame Species Conservation Act of 1973 (NSSA 23 2A-13 et seq) the list of endangered species (N J A C 7 25-4 13) and the list defining status of indigenous, nongame wildlife species of New Jersey (N.J.A C 7.25-4 17(a)). The status of animal species is determined by the Nongame and Endangered Species Program (ENSP) The state status codes and definitions provided reflect the most recent lists that were revised in the New Jersey Register, Monday, June 3, 1991

D Declining species-a species which has exhibited a continued decline in population numbers over the years

E Endangered species-an endangered species is one whose prospects for survival within the state are in immediate danger due to one or many factors - a loss of habitat, over exploitation, predation, competition, disease An endangered species requires immediate assistance or extinction will probably follow

EX Extirpated species-a species that formerly occurred in New Jersey, but is not now known to exist within the state

I Introduced species-a species not native to New Jersey that could not have established itself here without the assistance of man

INC Increasing species-a species whose population has exhibited a significant increase beyond the normal range of its life cycle, over a long term period

T Threatened species-a species that may become endangered if conditions surrounding the species begin to or continue to deteriorate

P Peripheral species-a species whose occurrence in New Jersey is at the extreme edge of its present natural range

S Stable spec es-a species whose population is not undergoing any long-term increase/decrease within its natural cycle

U Undetermined species-a species about which there is not enough information available to determine the status

Status for animals separated by a slash(/) indicate a duel status First status refers to the state breeding population, and the second status refers to the migratory or winter population

Plant taxa listed as endangered are from New Jersey's official Endangered Plant Species List N J.S A 131B-15.151 et seq

E Native New Jersey plant species whose survival in the State or nation is in jeopardy.

REGIONAL STATUS CODES FOR PLANTS

LP Indicates taxa listed by the Pinelands Commission as endangered or threatened within their legal jurisdiction Not all species currently tracked by the Pinelands Commission are tracked by the Natural Heritage Program. A complete list of endangered and threatened Pineland species is included in the New Jersey Pinelands Comprehensive Management Plan.

EXPLANATION OF GLOBAL AND STATE ELEMENT RANKS

The Nature Conservancy has developed a ranking system for use in identifying elements (rare species and natural communities) of natural diversity most endangered with extinction Each element is ranked according to its global, national, and state (or subnational in other countries) rarity. These ranks are used to prioritize conservation work so that the most endangered elements receive attention first. Definitions for element ranks are after The Nature Conservancy (1982. Chapter 4, 4 1-1 through 4 4.1 3-3)

GLOBAL ELEMENT RANKS

G1 Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction

G2 Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range

G3 Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout it's range, with the number of occurrences in the range of 21 to 100.

G4 Apparently secure globally, although it may be quite rare in parts of its range, especially at the periphery.

G5 Demonstrably secure globally, although it may be quite rare in parts of its range, especially at the periphery.

GH Of historical occurrence throughout its range i e , formerly part of the established biota, with the expectation that it may be rediscovered

GU Possibly in peril range-wide but status uncertain, more information needed

GX Believed to be extinct throughout range (e g , passenger pigeon) with virtually no likelihood that it will be rediscovered

G? Species has not yet been ranked

STATE ELEMENT RANKS

S1 Critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres)

Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state Also included are elements which were formerly more abundant, but because of habitat destruction or some other critical factor of its biology they have been demonstrably reduced in abundance In essence, these are elements for which, even with intensive searching sizable additional occurrences are unlikely to be discovered

S2 Imperiled in New Jersey because of rarity (6 to 20 occurrences) Historically many of these elements may have been more frequent but are now known from very few extant occurrences primarily because of habitat destruction Diligent searching may yield additional occurrences

S3 Rare in state with 21 to 100 occurrences (plant species in this category have only 21 to 50 occurrences) Includes elements which are widely distributed in the state but with small populations/acreage or elements with restricted distribution, but locally abundant Not yet imperiled in state but may soon be if current trends continue Searching often yields additional occurrences.

S4 Apparently secure in state, with many occurrences

S5 Demonstrably secure in state and essentially ineradicable under present conditions

SA Accidental in state including species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range, a few of these species may even have bred on the one or two occasions they were recorded, examples include European strays or western birds on the East Coast and vice-versa.

SE Elements that are clearly exotic in New Jersey including those taxa not native to North America (introduced taxa) or taxa deliberately or accidentally introduced into the State from other parts of North America (adventive taxa) Taxa ranked SE are not a conservation priority (viable introduced occurrences of G1 or G2 elements may be exceptions)

SH Elements of historical occurrence in New Jersey Despite some searching of historical occurrences and/or potential habitat, no extant occurrences are known Since not all of the historical occurrences have been field surveyed, and unsearched potential habitat remains historically ranked taxa are considered possibly extant, and remain a conservation priority for continued field work

SP Element has potential to occur in New Jersey, but no occurrences have been reported

SR Elements reported from New Jersey, but without persuasive documentation which would provide a basis for either accepting or rejecting the report In some instances documentation may exist, but as of yet, its source or location has not been determined

SRF Elements erroneously reported from New Jersey but this error persists in the literature

SU Elements believed to be n peril but the degree of rarity uncertain Also included are rare taxa of uncertain taxonomical standing More information is needed to resolve rank

SX Elements that have been determined or are presumed to be extirpated from New Jersey All historical occurrences have been searched and a reasonable search of potential habitat has been completed Extirpated taxa are not a current conservation priority

SXC Elements presumed extirpated from New Jersey but native populations collected from the wild exist in cultivation

SZ Not of practical conservation concern in New Jersey because there are no definable occurrences although the taxon is native and appears regularly in the state An SZ rank will generally be used for long distance migrants whose occurrences during their migrations are too irregular (in terms of repeated visitation to the same locations), transitory, and dispersed to be reliably identified, mapped and

protected. In other words, the migrant regularly passes through the state, but enduring, mappable element occurrences cannot be defined.

Typically, the SZ rank applies to a non-breeding population (N) in the state - for example, birds on migration. An SZ rank may in a few instances also apply to a breeding population (B), for example certain lepidoptera which regularly die out every year with no significant return migration.

Although the SZ rank typically applies to migrants, it should not be used indiscriminately. Just because a species is on migration does not mean it receives an SZ rank. SZ will only apply when the migrants occur in an irregular, transitory and dispersed manner.

B Refers to the breeding population of the element in the state.

N Refers to the non-breeding population of the element in the state.

T Element ranks containing a "T" indicate that the infraspecific taxon is being ranked differently than the full species. For example *Stachys palustris* var. *homotricha* is ranked "G5T? SH" meaning the full species is globally secure but the global rarity of the var. *homotricha* has not been determined; in New Jersey the variety is ranked historic.

Q Elements containing a "Q" in the global portion of its rank indicates that the taxon is of questionable, or uncertain taxonomical standing, e.g., some authors regard it as a full species, while others treat it at the subspecific level.

.1 Elements documented from a single location.

Note: To express uncertainty, the most likely rank is assigned and a question mark added (e.g., G2?). A range is indicated by combining two ranks (e.g., G1G2, S1S3).

IDENTIFICATION CODES

These codes refer to whether the identification of the species or community has been checked by a reliable individual and is indicative of significant habitat.

Y Identification has been verified and is indicative of significant habitat.

BLANK Identification has not been verified but there is no reason to believe it is not indicative of significant habitat.

? Either it has not been determined if the record is indicative of significant habitat or the identification of the species or community may be confusing or disputed.

State of New Jersey

Christine Todd Whitman
Governor

Department of Environmental Protection
Division of Fish, Game and Wildlife
Robert McDowell, Director
P O Box 400
Trenton, NJ 08625-0400
Visit our Website: www state.nj.us/dep/fgw

Robert C. Shinn, Jr.
Commissioner

November 4, 1999

Sam Pett, Project Technical Manager
Tetra Tech, Inc.
10306 Eaton Pl., Suite 340
Fairfax, VA 22030

Dear Mr. Pett:

Reference is made to your letter of September 30, 1999 requesting comments on the *Draft Integrated Natural Resource Management Plan Fort Monmouth, New Jersey.* Please know that the Division of Fish, Game and Wildlife [DFGW] does not have any major criticisms of the document; the management programs / initiatives proposed are supportable. However, the DFGW supplied information on this facility in an earlier preparation of the document; this information is not included in the document or Appendix A on Agency Correspondence. As suggested by you via telephone, a copy of the letter and accompanying informational appendices is attached for your use or attachment in Appendix A.

We hope this information is of service to you.

Sincerely,

Andrew Didun, Supervisor
DFGW, Office of Environmental Review

Attachment Letter with Appendices A thru D

c. R. McDowell, Director

State of New Jersey
Department of Environmental Protection
Division of Fish, Game and Wildlife
Robert McDowell, Director
P O Box 400
Trenton NJ 08625-0400

Christine Todd Whitman
Governor

Robert C Shinn, Jr
Commissioner

February 27, 1998

T.R. Wahlig, P.E., Chief
Environmental Division
Department of the Army
USAMC Installations & Services Activity
Rock Island, IL 61299-7190

Dear Mr. Wahlig:

Reference is made to your inquiry regarding the preparation of an Integrated Natural Resource Management Plan and Environmental Assessment for the U.S. Army Garrison Fort Monmouth. You are seeking the Division of Fish, Game and Wildlife's initial comments / concerns into the plan relative to fish and wildlife resources at the facility.

Due to the degree of development at Fort Monmouth and the surrounding area, wildlife resources are limited; we would not expect to find major populations of wildlife or unusual wildlife. No endangered / threatened species are noted for Fort Monmouth. However, as always, if suitable habitat is present, there is the potential that wildlife will seek its use. Therefore, a species list of fauna known to occur in Monmouth County or within the bounds of the Long Branch Quadrangle is attached for you information as Appendix A; a list of New Jersey's state endangered / threatened fauna is attached in Appendix B.

It appears that most of the notable natural resources are found in open waters and their associated riparian areas. Good numbers of diving and dabbling ducks will utilize waters areas of Parkers Creek and Oceanport Creek [and Shrewsbury River] during migration and winter. Waters downstream of Horseneck Point are classified as SE1 / Category 1 Waters [i.e. saline / estuarine waters receiving added protection under the Category 1 anti-degradation classification]. Waters here harbor a significant list of marine fish [Appendix C] as well as recreationally and commercially important shellfish resources [Appendix D - Maps]. These waters are typical of highly productive tidal backwaters of New Jersey's bays and estuaries. Such habitats are subject to threats from dredging, filling, bulkheading, excess runoff as well as other disturbances that can diminish or ruin productivity. We would expect that any management plan for Fort Monmouth would

SPECIES KNOWN TO OCCUR: MONMOUTH COUNTY

NAME	SCIENTIFIC NAME
Trout, brown	Salmo trutta
Mullet, white	Mugil curema
Sturgeon, Atlantic	Acipenser oxyrhynchus
Alewife	Alosa pseudoharengus
Trout, rainbow	Parasalmo mykiss
Trout, brook	Salvelinus fontinalis
Mudminnow, eastern	Umbra pygmaea
Pickerel, redfin	Esox americanus
Pickerel, chain	Esox niger
Goldfish	Carassius auratus
Carp, common	Cyprinus carpio
Shiner, golden	Notemigonus crysoleucas
Shiner, satinfin	Notropis analostanus
Lamprey, American brook	Lampetra appendix
Shiner, common	Notropis cornutus
Shiner, spottail	Notropis hudsonius
Dace, blacknose	Rhinichthys atratulus
Fallfish	Semotilus corporalis
Sucker, white	Catostomus commersoni
Chubsucker, creek	Erimyzon oblongus
Catfish, white	Ictalurus catus
Bullhead, brown	Ictalurus nebulosus
Catfish, channel	Ictalurus punctatus
Eel, American	Anguilla rostrata
Killifish, banded	Fundulus diaphanus
Perch, pirate	Aphredoderus sayanus
Perch, white	Morone americana
Bass, striped	Morone saxatilis
Sunfish, mud	Acantharchus pomotis
Sunfish, bluespotted	Enneacanthus gloriosus
Sunfish, redbreast	Lepomis auritus
Pumpkinseed	Lepomis gibbosus
Bluegill	Lepomis macrochirus
Bass, largemouth	Micropterus salmoides
Crappie, white	Pomoxis annularis
Crappie, black	Pomoxis nigromaculatus
Perch, yellow	Perca flavescens
Darter, tessellated	Etheostoma olmstedi
Treefrog, pine barrens	Hyla andersonii
Rattlesnake, timber	Crotalus horridus
Snake, northern pine	Pituophis melanoleucus
Turtle, common snapping	Chelydra serpentina
Turtle, eastern painted	Chrysemys picta
Turtle, bog	Clemmys muhlenbergii
Turtle, wood	Clemmys insculpta
Turtle, eastern box	Terrapene carolina
Loon, common	Gavia immer
Loon, red-throated	Gavia stellata
Grebe, red-necked	Podiceps grisegena
Grebe, horned	Podiceps auritus
Grebe, pied-billed	Podilymbus podiceps
Cormorant, great	Phalacrocorax carbo
Cormorant, double-crested	Phalacrocorax auritus
Heron, green-backed	Butorides virescens
Heron, little blue	Florida caerulea
Egret, great	Casmerodius albus

Killdeer	Charadrius vociferus
Plover, piping	Charadrius melodus
Plover, lesser golden	Pluvialis dominica
Plover, black-bellied	Pluvialis squatarola
Godwit, Hudsonian	Limosa haemastica
Godwit, marbled	Limosa fedoa
Sandpiper, upland	Batramia longicauda
Yellowlegs, greater	Tringa melanoleuca
Willet, eastern	Catoptrophorus semipalmatus
Sandpiper, spotted	Actitis macularia
Turnstone, ruddy	Arenaria interpres
Phalarope, Wilson's	Phalaropus tricolor
Phalarope, red-necked	Phalaropus lobatus
Woodcock, American	Scolopax minor
Snipe, common	Capella gallinago
Dowitcher, short-billed	Limnodromus griseus
Dowitcher, long-billed	Limnodromus scolopaceus
Sanderling	Calidris alba
Sandpiper, semipalmated	Calidris pusilla
Sandpiper, western	Calidris mauri
Sandpiper, least	Calidris minutilla
Sandpiper, white-rumped	Calidris fusicollis
Sandpiper, Baird's	Calidris bairdii
Sandpiper, pectoral	Calidris melanotos
Dunlin	Calidris alpina
Sandpiper, curlew	Calidris ferruginea
Sandpiper, stilt	Calidris himantopus
Sandpiper, buff-breasted	Tryngites subruficollis
Gull, glaucous	Larus hyperboreus
Gull, Iceland	Larus glaucoides
Gull, great black-backed	Larus marinus
Gull, lesser black-backed	Larus fuscus
Gull, herring	Larus argentatus
Gull, ring-billed	Larus delawarensis
Gull, common black-headed	Larus ridibundus
Gull, laughing	Larus atricilla
Gull, Bonaparte's	Larus philadelphia
Gull, little	Larus minutus
Tern, gull-billed	Gelochelidon nilotica
Tern, Forster's	Sterna forsteri
Tern, common	Sterna hirundo
Tern, least	Sterna antillarum
Tern, royal	Thalasseus maximus
Tern, Caspian	Sterna caspia
Tern, black	Chlidonias niger
Skimmer, black	Rynchops niger
Dove, mourning	Zenaida macroura
Redstart, American	Setophaga ruticilla
Owl, common barn	Tyto alba
Owl, eastern screech	Otus asio
Owl, great horned	Bubo virginianus
Owl, snowy	Nyctea scandiaca
Owl, barred	Strix varia
Owl, long-eared	Asio otus
Owl, northern saw-whet	Aegolius acadicus
Whip-poor-will	Caprimulgus vociferus
Kingfisher, belted	Ceryle alcyon

MONMOUTH COUNTY [cont.]

Sparrow, white-throated	Zonotrichia albicollis
Sparrow, Lincoln's	Melospiza lincolnii
Sparrow, song	Melospiza melodia
Longspur, Lapland	Calcarius lapponicus
Bunting, snow	Plectrophenax nivalis
Goose, greater snow	Chen caerulescens
Mole, eastern	Scalopus aquaticus
Bat, red	Lasiurus borealis
Bat, big brown	Eptesicus fuscus
Bat, hoary	Lasiurus cinereus
Raccoon	Procyon lotor
Mink, common	Mustela vison
Fox, red	Vulpes vulpes
Bobcat	Felis rufus
Fox, Gray	Urocyon cinereoargenteus
Chipmunk, common eastern	Tamias striatus
Squirrel, gray	Sciurus carolinensis
Beaver, Canadian	Castor canadensis
Muskrat, common	Ondatra zibethicus
Cottontail, eastern	Sylvilagus floridanus
Deer, white-tailed	Odocoileus virginianus

248 Rows Processed

SPECIES KNOWN TO OCCUR: LONG BRANCH QUAD

TREND.	NAME.....	SCIENTIFIC NAME.....
U	Sturgeon Atlantic	Acipenser oxyrhynchus
S	Bass, striped	Morone saxatilis
S	Bass, largemouth	Micropterus salmoides
-		
SE	Treefrog, pine barrens	Hyla andersonii
ST	Snake, northern pine	Pituophis melanoleucus
FC		
D	Turtle, common snapping	Chelydra serpentina
SE	Turtle, bog	Clemmys muhlenbergii
FC		
INC	Swan, tundra	Cygnus columbianus
INC	Goose, Canada	Branta canadensis
S	Brant	Branta bernicla
INC	Mallard	Anas platyrhynchos
D	Duck, American black	Anas rubripes
D	Pintail, northern	Anas acuta
S	Teal, green-winged	Anas crecca
S	Teal, blue-winged	Anas discors
SE	Eagle, bald	Haliaeetus leucocephalis
FE		
S	Bobwhite, northern	Colinus virginianus
I	Pheasant,Ring-necked	Phasianus colchicus
SE	Sandpiper, upland	Batramia longicauda
D	Woodcock, American	Scolopax minor
S	Warbler, orange-crowned	Vermivora celata
S	Squirrel, gray	Sciurus carolinensis
S	Deer, white-tailed	Odocoileus virginianus

23 Rows Processed

AMPHIBIANS

Endangered

Tremblay's Salamander, *Ambystoma tremblayi*
Blue-spotted Salamander, *Ambystoma laterale*
Eastern Tiger Salamander, *Ambystoma t. tigrinum*
Pine Barrens Treefrog, *Hyla andersonii*
Southern Gray Treefrog, *Hyla chrysoscelis*

Threatened

Long-tailed Salamander, *Eurycea longicauda*
Eastern Mud Salamander, *Pseudotriton montanus*

MAMMALS

Endangered

Bobcat, *Lynx rufus*
Eastern Woodrat, *Neotoma floridana*
Sperm Whale *Physeter, macrocephalus***
Fin Whale, *Balaenoptera physalus***
Sei Whale, *Balaenoptera borealis***
Blue Whale, *Balaenoptera musculus***
Humpback Whale, *Megaptera novaeangliae***
Black Right Whale, *Balaena glacialis***

INVERTEBRATES

Endangered

Mitchell's Satyr (butterfly), *Neonympha m. mitchellii***
Northeastern Beach Tiger Beetle, *Cicindela d. dorsalis*
American Burying Beetle, *Nicrophorus americanus***
Dwarf Wedge Mussel, *Alasmidonta heterodon***

**Federally endangered

FISH

Endangered

Shortnose Sturgeon, *Acipenser brevirostrum***

List revisions: March 29, 1979
January 17, 1984
May 6, 1985
July 20, 1987
June 3, 1991

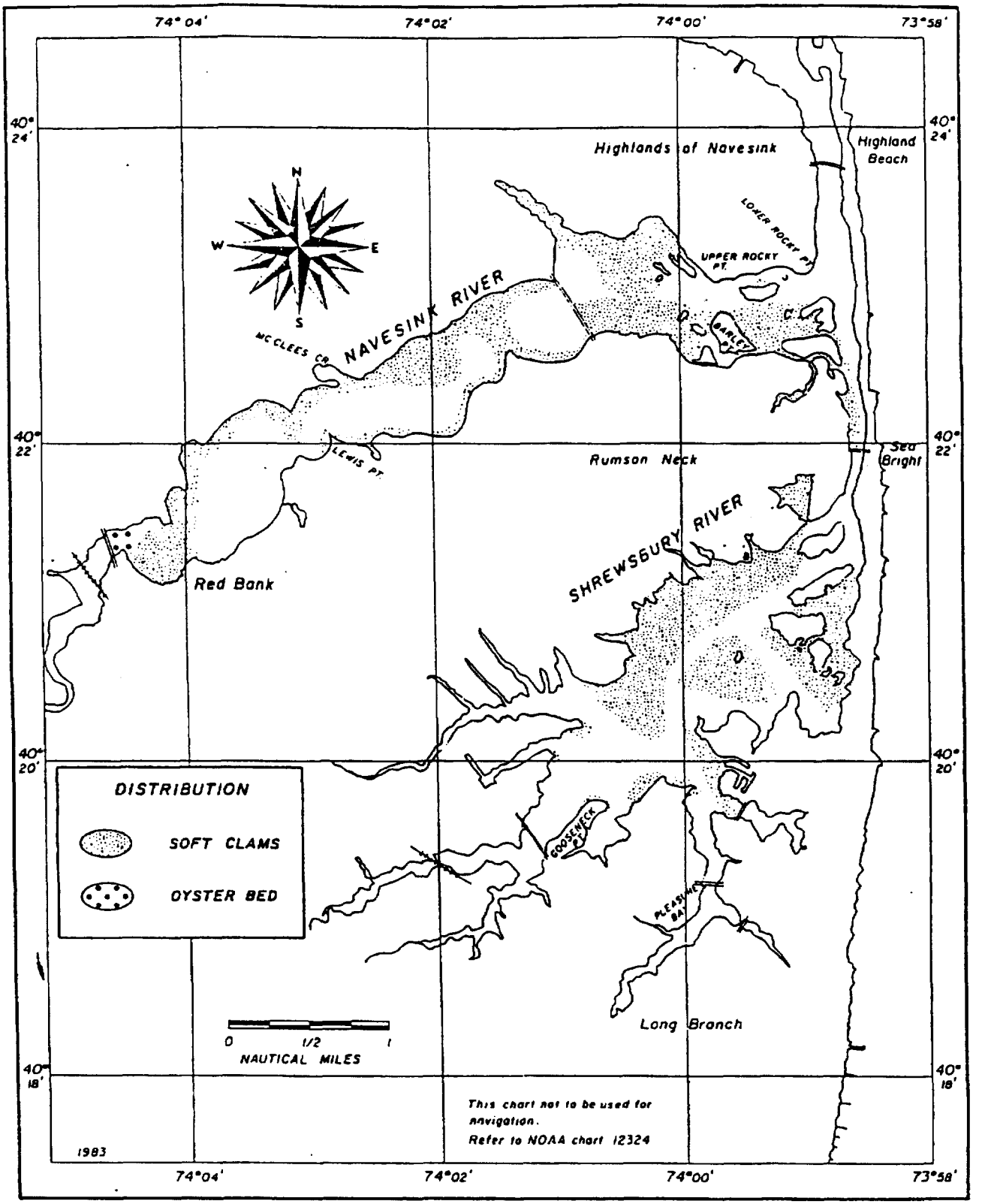
The lists of New Jersey's endangered and nongame wildlife species are maintained by the DEP&E's Division of Fish, Game and Wildlife's, Endangered and Nongame Species Program. These lists are used to determine protection and management actions necessary to insure the survival of the State's endangered and nongame wildlife. This work is made possible only through voluntary contributions received through the Wildlife Check-off on the New Jersey State Tax Form. The Wildlife Check-off is the only major funding source for the protection and management of the State's endangered and nongame wildlife resource. For more information about the Endangered and Nongame Species Program or to report a sighting of endangered or threatened wildlife contact: Endangered and Nongame Species Program, Northern District Office, Box 383 R.D. 1, Hampton, N.J. 08827 or call (908) 735-8975.

C

2 of 3

TOTAL NUMBER OF FISHES AND INVERTEBRATES COLLECTED
BY BEACH SEINE AT SANDS POINT, BRANCHPORT CREEK
JUNE 1982 - MAY 1983

SPECIES	NUMBER
AMERICAN EEL	6
ATLANTIC MENHADEN	8
STRIPED ANCHOVY	1
BAY ANCHOVY	118
OYSTER TOADFISH	145
ATLANTIC NEEDLEFISH	12
SHEEPSHEAD MINNOW	4
MUMMICHOG	10737
STRIPED KILLIFISH	363
INLAND SILVERSIDE	3170
ATLANTIC SILVERSIDE	2927
FOUR SPINE STICKLEBACK	266
NORTHERN PIPEFISH	6
BLUEFISH	16
WEAKFISH	44
TAUTOG	4
NAKED GOBY	1
WINTER FLOUNDER	2
GRASS SHRIMP	21877
GRASS SHRIMP	104
SAND SHRIMP	563
GREEN CRAB	3
BLUE CRAB	11
MUD CRAB	18
	0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Highlands of Navesink
Highland Beach
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LOWER ROCKY PT.
UPPER ROCKY PT.
MC CLEES CR.
NAVESINK RIVER
GARLEY PT.
LEWIS PT.
Rumson Neck
Sea Bright
SHREWSBURY RIVER
Red Bank
GOOSENECK PT.
PLEASURE BAY
Long Branch
DISTRIBUTION
SOFT CLAMS
OYSTER BED
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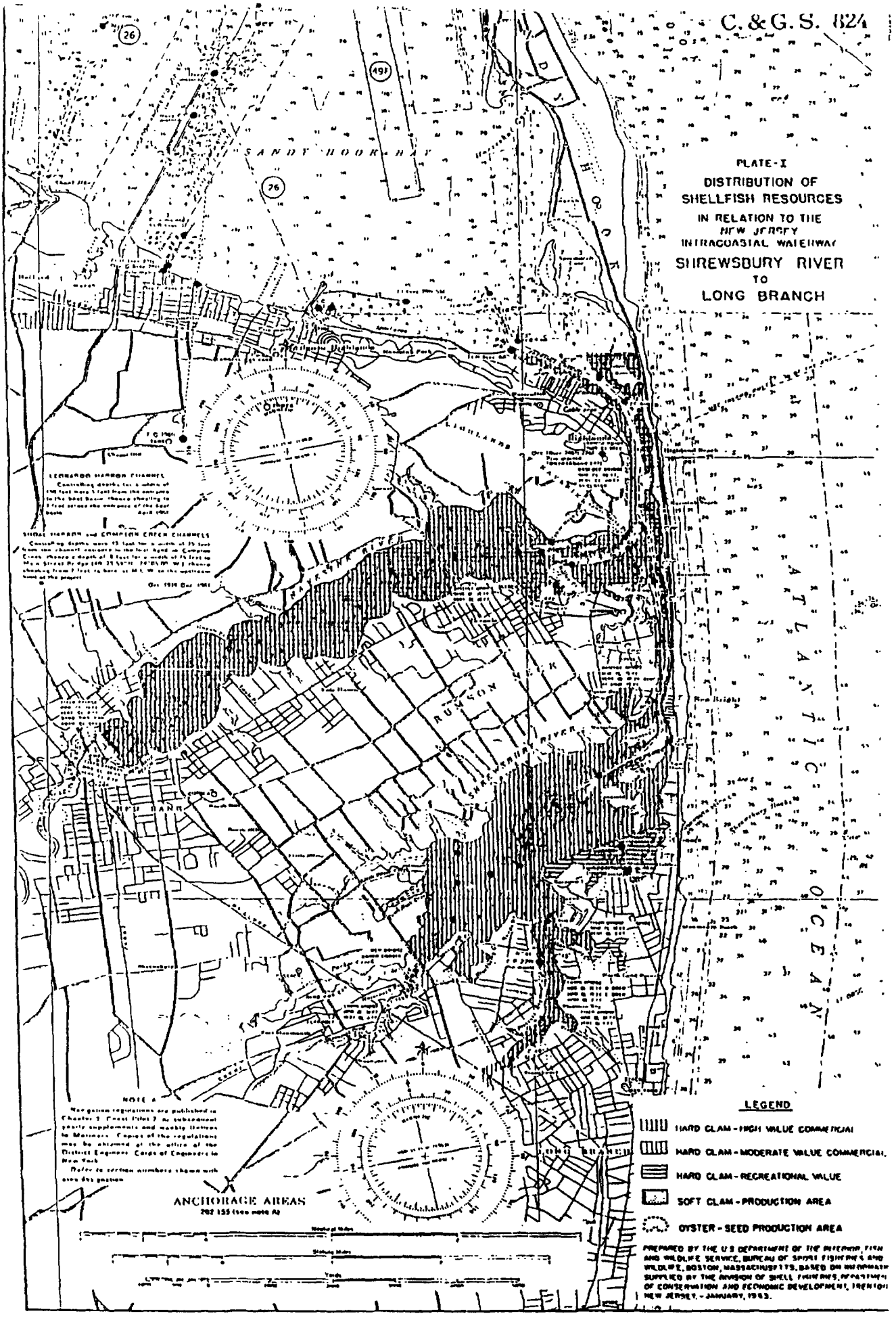
Refer to NOAA chart 12324
1983

C. & G. S. 824

D
3 of 3



APPENDIX C

North American Bat House Research Project

North American Bat House Research Project

Criteria for Successful Bat Houses

Design

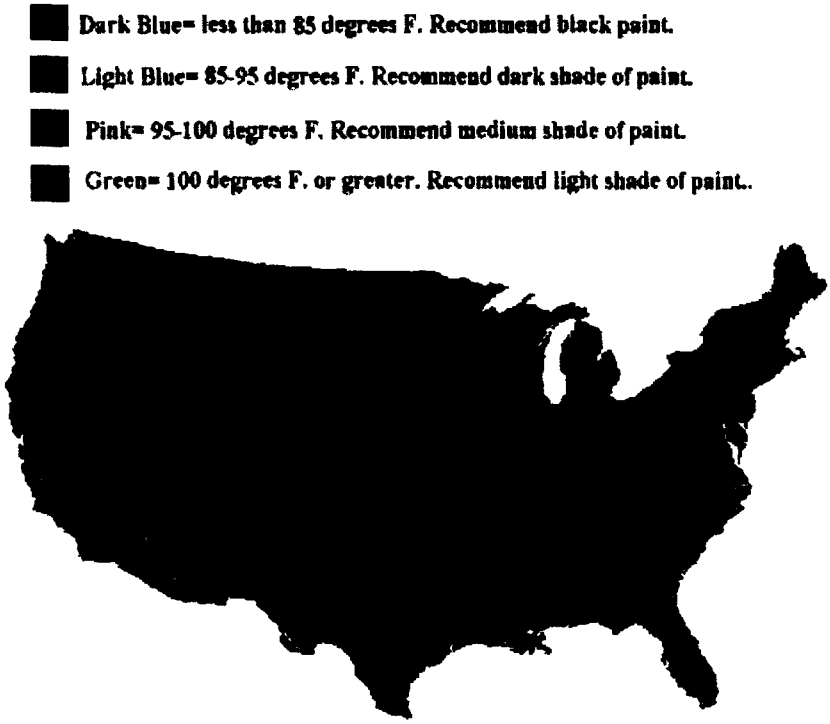
All bat houses should be at least two feet tall, 14 inches or more wide, and have a 3-6-inch landing area extending below the entrance. Most houses have 1-4 roosting chambers. Roost partitions should be carefully spaced 3/4 to 1 inch apart. All partitions and landing areas should be roughened. Wood surfaces can be scratched or covered with durable plastic screening (1/8 or 1/4-inch mesh, available from companies such as Internet, Inc. at 1-800-328-8456). Include vents six inches from the bottoms of all houses to be used where average July high temperatures are 85 F. or above. Front vents are as long as a house is wide, side vents 6 inches tall by 1/2 inch wide.

Construction

A combination of exterior plywood and cedar is best. Do not use pressure-treated wood. Any staples used must be exterior grade or galvanized. Caulk all seams, especially around the roof.

Wood Treatment

Paint the exterior with three coats of outdoor paint. Available observations suggest that color should be black where average high temperatures in July are 80-85 F, dark colors (such as dark brown or gray) where they are 85-95 F, medium or light colors where they are 95-100 F, and white where they exceed 100 F. Much depends upon amount of sun exposure; adjust to darker colors for less sun.



Sun Exposure

Houses where high temperatures in July average 80 F, or less, should receive at least 10 hours of sun; more is better. At least six hours of direct daily sun are recommended for all bat houses where daily high temperatures in July average less than 100 F.

Habitat

Most nursery colonies of bats choose roosts within 1/4 mile of water, preferably a stream, river, or lake. Greatest bat house success has been achieved in areas of diverse habitat, especially where there is a mixture of differing agricultural use and natural vegetation. Bat houses are most likely to succeed in regions where bats are already attempting to live in buildings.

Mounting

Bats find houses mounted on poles or buildings more than twice as fast as on trees, which are also less preferred. Houses mounted on metal siding have not been used. Wood or stone buildings with proper solar exposure are ideal, and locations under the eaves often have been successful. Mounting two bat houses back to back, 3/4 inch apart on poles, both covered by a tin roof, helps protect from overheating in hot climates. All bat houses should be mounted at least 10 feet above ground; 15-20 feet is better. Bat houses should not be lit by bright lights.

Protection from Predators

Houses mounted on sides of buildings or high up on poles provide the best protection from predators. This may be a key factor in determining bat choice. Locations at least 20-25 feet from the nearest tree are best. However, houses may be found more quickly if located along forest or water edges where bats tend to fly.

Avoiding Uninvited Guests

Wasps can be a problem before bats fully occupy a house. Use of 3/4-inch roosting spaces reduces wasp use. If nests accumulate, they should be removed in late winter or early spring before either wasps or bats return. Open-bottom houses greatly reduce problems with birds, mice, squirrels, or parasites, and guano does not accumulate inside.

Timing

Bat houses can be installed at any time of the year, but are more likely to be used their first summer if installed before the bats return in spring. When using bat houses in conjunction with excluding a colony from a building, install the bat houses 2-6 weeks before the actual eviction.

Importance of Local Experimentation

We have much to learn about the needs of individual bat species in differing climates. It is important to test for local needs before putting up more than three to six houses, especially comparing houses of different darkness and sun exposure.

Excerpted and summarized from *The Bat House Builder's Handbook*, 1996 Revision,

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APPENDIX D

Problem Geese, *Monmouth County Planning Board Eco-Tips*

MONMOUTH COUNTY PLANNING BOARD'S

ECO-TIPS: Problem Geese

INTRODUCTION

Canada Geese *(Branta canadensis)* are a beautiful reminder of the change of the seasons. Their fall migrations signal the end of summer, while their flight overhead in March hints at the arrival of warmer weather. Migrating geese rarely overwhelm an area: They move on before all resources are gone. Large non-migrating populations, however, can be disastrous to the small areas they inhabit. This brochure will describe several things that you can do to manage non-migrating *"problem geese".*

PROBLEM GEESE

The non-migrating or *"resident"* population does not spend summer in the Tundra, like migrant geese. They live, instead, on ball fields, large lawns, and golf courses. They find water in the detention basins and landscaped ponds of recreational or residential areas. They have no natural predators, ample food supplies, and laws which protect them from harm. They have no need to migrate.

Resident geese have small habitats, and as the population grows, they can become aggressive toward people, domestic pets, and native waterfowl. Large populations cause property damage and can pose health risks from salmonella or other bacteria. Studies indicate that a goose creates about 1-250 pounds of fecal matter per year. The effect of such high levels of nutrients on our lakes and ponds can be devastating.

Large populations of non-migrating resident geese can be ecologically damaging to lakes and ponds. Belmar discourages feeding at Silver Lake through the posting of informational signs.

GEESE ARE PROTECTED

Federal laws intended to protect migrating waterfowl also protect resident geese. It is very difficult to tell resident geese from migrating geese during the migration period, as they are essentially identical in appearance. The United States Fish and Wildlife Service has the unique challenge of protecting migrating geese while addressing the problems created by a resident population. They work with state and local authorities on nuisance issues and regulate sport hunting, capture and removal of resident geese, after other alternatives are exhausted.

INTEGRATED MANAGEMENT PLANS

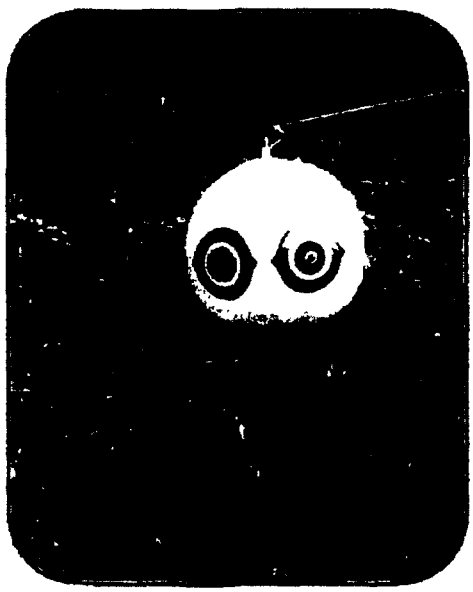
Before addressing the issues of a resident goose population in your community, you should prepare an integrated plan for their management. A comprehensive plan includes the following steps: Preventative Measures, where the geese are not already a significant problem; Habitat Management; Harassment Alternatives; and finally,

Population Control Measures. It is most constructive to start before the geese become a *"problem"*.

PREVENTATIVE MEASURES

If the population of resident geese is not yet a significant issue in your community, there are several options you can try to make your site less attractive to geese. If you have a lake or pond, or large grassy areas where geese might congregate, you should prohibit feeding. Feeding waterfowl makes them more dependant on humans and less likely to migrate. Eating foods which are not naturally a part of their diet, like white bread, can affect their overall health; and resulting high nutrient levels can cause an algae bloom in your lake.

To reduce the appeal of your site, you can install inexpensive "scarecrows". Scarecrows must be visible to geese in flight and should be moved periodically to keep up the charade. *"Eyespot balloons"* make effective scarecrows. These inflatable, vinyl globes are decorated with circles, to resemble large eyes. Helium filled, or hung from poles, they move in the breeze and appear like the "eyes" of predators. Shiny mylar ribbon or garbage bags, stapled to a stake at an angle, may also be useful against geese in flight.



A farmer in Howell Township uses the eyespot balloons to keep problem geese out of the crops.

Flying geese need long grassy strips or open water to land. They also need clear, gently sloping access between grass and water, for flightless periods. Managing your site, by reducing attractive habitat can prevent new populations from settling in.

HABITAT MANAGEMENT

Molting geese and goslings cannot fly. Therefore, they will be less likely to inhabit a site that has barriers at the water's edge. Fencing, woody shrubs, or tall, thick grasses can provide suitable barriers when they are at least 2.5 feet in height. Do not mow the edges of ponds, especially when geese are starting to nest. Reducing lawn areas, or breaking up these large "landing zones" with clusters of trees and shrubs, can also be productive.

West Long Branch has installed attractive barriers as part of their integrated management plan for Franklin Lake.

Some plants are not palatable to geese. Plant Tall Fescue, an unfavorable grass, or mix grasses with periwinkle, ivy, myrtle or pachysandra. This will reduce the appeal of the feeding ground. Applying environmentally safe repellents may also help. One is made from the same chemicals found in artificial grape flavoring *(methyl anthranilate)*. Repellents, however, need to be reapplied after each rainfall and this can become a costly process.

HARASSMENT ALTERNATIVES

Dog patrols, aggressive behavior and loud noises can turn geese away. No Federal or State Permits are required to

harass geese as long as the birds are not touched, injured or killed. Harassment should be carefully planned with advice from the regulatory agencies. Properly trained dog patrols use herding techniques and eye contact to influence geese. Geese recognize the wolf-like breeds typically used, as potential predators. Aggressive human behavior, such as repeated chasing from the site by an adult armed with a broom, may prevent geese from choosing to nest on your site. Loud noises can also be effective. Pyrotechnics, discharged from a small canon or shotgun, are useful, but can be dangerous. They are not recommended for highly populated areas. Your community may have ordinances which would prohibit their use.

POPULATION CONTROLS

Once a resident population has become entrenched, harassment may not be enough. Hunting, reproductive control and depredation are three population control methods for removal. All three of these measures are regulated by federal and state agencies. Hunting requires a valid state license and both state and federal waterfowl stamps. Two special seasons typically occur in New Jersey: An early season in September and a late Winter-Spring season. The early season is open throughout the state, wherever hunting is typically permitted and safe. The late season is restricted to distinct zones. The New Jersey Division of Fish, Game and Wildlife publishes specific hunting information in the Fish and Wildlife Digest.

Reproductive control requires a permit and consists of treating nests or eggs to prevent hatching. It is more effective to leave the nest or eggs in place after treatment, as geese will rebuild and lay new eggs if removed. Depredation can only be done when a Federal/State permit is issued. Population control techniques should only be done when all other measures have failed and there is some risk to human health or safety, or when property damage is severe.

An integrated management plan can be a valuable tool for establishing which procedures your community will use

and the timing of various techniques. This plan will also be helpful in securing state or federal permits, if depredation or reproductive control become necessary.

To avoid such measures, find a balance early on between the resident goose population and the resident human population. Then, they may not become *"problem geese."*

FOR MORE INFORMATION CALL:

Monmouth Co. Planning Board
Environmental Planning Section
at (732) 431-7460

US Dept. of Agriculture
Wildlife Services Program
at (908) 735-5654

OR WRITE:
Monmouth Co. Planning Board
Hall of Records Annex
One East Main Street
Freehold, N.J. 07728

For hunting information, call:
NJ Bur. of Wildlife Management
at (609) 292-6685

To report banded birds, call:
NJ Div. of Fish, Game & Wildlife
at 1(800) 327 - BAND

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ACRONYMS AND ABBREVIATIONS

AEC	United States Army Environmental Center
AEHA	U.S. Army Environmental Hygiene Agency
AMC	Army Materiel Command
AR	Army Regulation
CECOM	Communications Electronics Command
CEQ	Council on Environmental Quality
CMD	Contracts Management Division
CFR	Code of Federal Regulations
CRMP	Cultural Resources Management Plan
CWA	Clean Water Act
DPW	Department of Public Works
DoD	Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
EPR	Environmental Program Requirements
ESA	Endangered Species Act
ESMP	Endangered Species Management Plan
°F	degrees Fahrenheit
FIFRA	Federal Insecticide, Fungicide and Rodenticide Act
FNSI	Finding of No Significant Impact
FY	fiscal year
HQDA	Headquarters Department of the Army
ICUZ	installation compatibility use zone
IDG	Installation Design Guide
INRMP	Integrated Natural Resources Management Plan
kVA	kilovolt-amperes
LBP	lead-based paint
mgd	million gallons per day
MOU	Memorandum of Understanding
msl	mean sea level
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NJDEP	New Jersey Department of Environmental Protection
NJDFGW	New Jersey Division of Fish, Game, and Wildlife
NRHP	National Register of Historic Places
PCB	polychlorinated biphenyl
PLS	planning level survey
RCRA	Resource Conservation and Recovery Act
RDEC	Research Development and Engineering Center
SHPO	State Historic Preservation Office
SOP	standard operating procedure
TSCA	Toxic Substances Control Act
U.S.C.	U.S. Code
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventative Medicine
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank